CITY OF MURFREESBORO

WASTEWATER FACILITIES PLAN
2002 Revision

VOLUME 2

WASTEWATER TREATMENT AND DISPOSAL SYSTEMS

January, 2002

MWSD

SSR

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BIBLIOGRAPHY

"Wastewater Facilities Plan, 1992 Revision", October 1994, Smith Seckman Reid, Inc Engineers, Nashville, Tennessee

"General Development Plan for the Blackman Community", December 2000, Barge Waggoner Sumner & Cannon, Inc, Consulting Engineers, Nashville, Tennessee

"Salem Pike Study/ Land Use Plan", October 2001,RM Planning Group, Wiser Company, and RPM & Associates

"North Area Subarea General Land Use Policy Plan of Rutherford County", July 2001, Wiser Company, Murfreesboro, Tennessee

"Rutherford County Community Strategic Plan", Rutherford County Community and Rutherford County Planning Department, 2000

"Effluent Water Reuse Feasibility Study", March 1999, Smith Seckman Reid, Inc., Consulting Engineers, Nashville, Tennessee

"Effluent Spray Disposal Demonstration Project", January 2001, Smith Seckman Reid, Inc., Consulting Engineers, Nashville, Tennessee

"Inflow and Infiltration Analysis", September 1996, ADS, Inc.

"City of Murfreesboro Major Thoroughfare Plan", February 1999, Murfreesboro Planning and Engineering Department

United States Government, 2000 Census

"Sewer Master Plan- Districts A,B, & J", September 2000, Wiser Company

"Lytle Creek Sanitary Sewer Assessment District- Preliminary Engineering Study and Assessment Report", January 2000, SEC, Inc.

"Master Plan- District 66- Osbourne Lane- Special Sanitary Assessment District", June 2001, Wiser Company

"Sewer Master Plan- Districts 71 & 72- Wastewater Facilities 201 Plan", May 2000, Wiser Company

"Buchanan & Elam Roads Interchanges- Sanitary Sewer Assessment District", January 2001, Wiser Company

Overall Creek Assessment District Study, Smith Seckman Reid, Inc.

US 41/Florence Road Assessment District Study, April 2001, MWSD

Overall Creek Basin "C" Assessment District Study, February 2000, MWSD

John Bragg Highway Assessment District Study, MWSD

Thompson Lane Assessment District Study, MWSD

1. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

1.1 *Statement of Problem*

Murfreesboro was recently named as the Most Livable Town in Tennessee. Therefore, it is little wonder that Murfreesboro is also one of the fastest growing cities in Tennessee.

Murfreesboro has a long and sustained record of progressive leadership. Growth has been quite healthy over the last 50 years. The City has managed to retain its character, including a number of antebellum homes and other ties with its early history.

In order to maintain its orderly and stable growth, the City has periodically authorized engineering studies and planning reports to update the long range plan for growth of municipal utilities, including the water and sewer systems. The most recent study of the sewer system was the 201 Facilities Plan Update completed in 1992. Since then, many of the improvements proposed in the Study have been completed. These include the expansion of the Sinking Creek WWTP, the Overall Creek Basin Collection System and many others. Development in areas surrounding the City has resulted in the need to plan future expansion of the municipal sewer system. In addition, the City (along with other local entities) adopted a new planning area for potential city services in 2000 known as the Urban Growth Boundary (UGB). The UGB significantly expanded the potential service area for the City. This “Wastewater Facilities Plan - 2001 Revision” has been authorized to provide a roadmap for improvements over the next 20 years and beyond.

This report describes additions and improvements required in the Murfreesboro wastewater treatment system. The objective of the report is

to develop preliminary sizes, locations, and costs for upgrading and expanding the Murfreesboro wastewater treatment system. The report updates the "Facilities Plan for Sanitary Sewerage Improvements, City of Murfreesboro, Tennessee", published in April 1974 and the 201 Facilities Plan Update of 1992.

1.2 *Summary of Alternative Solution Considered*

Alternative solutions were analyzed for each of the wastewater treatment system additions proposed in this plan. Potential improvements to the Murfreesboro wastewater treatment system were limited to one of six alternatives. They are as follows:

- No Action
- Expansion of the SCWWTP with all effluent exceeding the permitted 16 mgd being pumped to the Cumberland River
- Expansion of the SCWWTP with all effluent exceeding the permitted 16 mgd being pumped to a submerged discharge into the J. Percy Priest Reservoir
- Expansion of the SCWWTP with all effluent exceeding the permitted 16 mgd being pumped into a nonpotable reuse distribution system
- Expansion of the SCWWTP with the addition of advanced treatment technologies that could limit the TMDL to within permit limits at the higher discharge flow
- Construction of a new advanced treatment/zero discharge facility in the southwestern corridor of town

Each of these alternatives are thoroughly evaluated in Section 7 for ease of implementation, cost effectiveness, feasibility, and environmental impacts.

1.3 ***Recommended Solution***

After thorough evaluation of each of the alternatives and numerous discussions with MWSD personnel, it is recommended that planning begin on the expansion of the Sinking Creek Wastewater Treatment Plant within the next five years. The significant levels of growth projected for the City of Murfreesboro will undoubtedly lead to increased flow rates at the treatment plant. It is anticipated that these increased flows will surpass the existing plant's capacity within five to ten years. Flow projections indicate that an expansion from 16 mgd to 24 mgd should be sufficient to treat the average daily sewage flows generated within the Planning Area through 2022. This level of expansion is herein referred to as the Phase IV expansion.

However, increasing concentrations of BOD and TSS in the influent flow may necessitate further expansion to account for excessive mass loadings currently experienced at the SCWWTP. Additionally, modifications may be necessary to the existing treatment facilities to provide sufficient oxygen for treatment at the increased concentrations. It is advisable that the MWSD undertake a study to determine the sources of increased mass loadings of BOD and TSS in the collection system. If these sources cannot be isolated and concentrations of these constituents continue to increase at the treatment facilities, additional capacity will be required for proper treatment. This additional expansion is herein referred to as the Phase V expansion.

It is recommended that provisions be made in the plant design to allow for the introduction of advanced treatment technologies such as membrane filtration and biosolids pelletization in the future. Technologies such as these may be required to meet increasingly stringent treatment and disposal regulations within the Study Period. These improvements are referred to herein as Phase VI Improvements.

It is recommended that Murfreesboro Water and Sewer Department develop Phases 1-S, 1-N, and 2 of the proposed reuse system. Phase 1-S will establish the southern portion of the reuse distribution system and will be routed from the SCWWTP to the proposed Medical Center and the Old Fort Golf Course. Phase 1-N will establish the northern portion of the distribution system and will be routed from the SCWWTP along Thompson Lane to the Veteran's Administration (VA) Golf Course and the water treatment plant site. Both golf courses have expressed interest in utilizing reuse water for irrigation of their facilities. Utilization of non-potable reuse at these public courses will be invaluable in the education process of the residents of Murfreesboro to the benefits of this commodity. Phase 2 of the proposed reuse network will loop the distribution system and will allow numerous other commercial and industrial customers to connect to the system. These improvements will allow effluent flows above 16 mgd to be disposed through reuse or land application.

Planning for Phases 1-S and 1-N should begin immediately and these improvements should be online by 2003. Phase 2 should be online by 2006. Although current average plant flow rates do not yet require a mandatory disposal of effluent yet, it is advisable to begin the process of identifying and procuring sites and potential customers of non-potable reuse water. Education of the public as to the necessity and benefits of this commodity will assist the MWSD in attracting users in the future.

The estimated construction cost of the recommended course of action is summarized in Table 1.1. Section 7 of this Facilities Plan includes estimated construction costs of the other alternatives. In addition, a Present Worth Analysis of the life cycle costs of each alternative is included in that Section. Factors including the electrical and chemical costs associated with each alternative were included to determine the long-term benefits and costs of each. Although the analysis did not indicate that construction of the entire non-potable reuse system would be the lowest cost option over the 20-year Planning Period, other factors

were considered in the selection of this alternative. One of the benefits of disposal through a reuse system is that the system can be constructed incrementally. This will allow the MWSD to add to the distribution system as needed rather than in one lump sum. This also allows the Department flexibility as growth patterns within the City continue to evolve. While this alternative is not without its complications, non-potable reuse appears to be the most advantageous solution to the City of Murfreesboro's effluent disposal needs.

Table 1.1
Recommended Capital Improvements

ITEM	IMPROVEMENT	COST
PHASE IV PLANT EXPANSION	PUMP STATION IMPROVEMENTS	399,850
	HEADWORKS	3,997,750
	BIOLOGICAL PHOSPHOROUS REMOVAL	1,183,025
	EXTENDED AERATION	5,114,750
	CLARIFICATION	5,108,500
	FILTRATION	5,427,800
	DENITRIFICATION MODIFICATIONS	500,000
	ULTRAVIOLET LIGHT DISINFECTION	1,348,000
	POST AERATION	136,000
	EFFLUENT PUMPING	790,050
	HYPOCHLORITE GENERATION	1,455,000
	BIOSOLIDS HOLDING	4,620,000
	BIOSOLIDS DEWATERING	1,505,500
	SUBTOTAL	**$31,586,225**
NON-POTABLE REUSE SYSTEM	PHASE 1-S IMPROVEMENTS	3,473,250
	PHASE 1-N IMPROVEMENTS	3,168,844
	PHASE 2 IMPROVEMENTS	6,461,250
	SUBTOTAL	**$13,103,344**
	TOTAL PHASE IV AND INITIAL REUSE PHASES	**$44,689,569**
PHASE V PLANT EXPANSION (OPTIONAL- NEED MUST BE DETERMINED THROUGH SYSTEM-WIDE BOD/TSS EVALUATION)	PUMP STATION IMPROVEMENTS	1,975,000
	HEADWORKS	2,616,750
	EXTENDED AERATION	4,991,750
	CLARIFICATION	4,412,500
	FILTRATION	917,500
	METHANOL STORAGE	150,000
	ULTRAVIOLET LIGHT DISINFECTION	1,248,000
	POST AERATION	136,000
	BIOSOLIDS HOLDING	1,540,000
	BIOSOLIDS DEWATERING	2,405,500
	TOTAL PHASE V	**$18,282,000**

2. PURPOSE AND NEED

2.1 *Study Purpose*

The City of Murfreesboro completed an update of its 201 Facilities Plan in 1992. This updated plan indicated that there were certain short-term and long-term improvements for the Murfreesboro Wastewater Treatment System.

Since 1992, the recommended improvements to the Sinking Creek Wastewater Treatment Plant (SCWWTP) have been executed by the Murfreesboro Water and Sewer Department. At the same time, the City and Rutherford County have grown significantly as evidenced by the results of the 2000 U.S. census. In addition, the City has adopted an Urban Growth Boundary which expands its potential area of influence more than five fold.

The purpose of this study is to evaluate the City's wastewater treatment system needs in light of the above. This study is intended to provide guidance for the Murfreesboro Water and Sewer Department in planning, scheduling and budgeting improvements for its wastewater treatment system.

2.2 *Need for this Project*

The need for construction of wastewater treatment system improvements in the Murfreesboro service area draws from the increasing population served by the system, the flows generated, and the increased strength of the wastewater received at the SCWWTP. Table 2.1 indicates present and projected average flow rates in the Murfreesboro service area. In addition, the table indicates the peak flow rates. The need for

improvements is clearly indicated where the projected flows and wet weather peak flows exceed the capacity of the City's treatment system.

Table 2.1
Current and Projected Flow Rates in the Interceptor Sewer System

SYSTEM	Size (in)	Capacity (mgd)	Current Pop. Equiv. Served	Current* ADF (mgd)	Current* WWPF (mgd)	2020 Pop. Equiv. Served	2020 ADF (mgd)	2020 WWPF (mgd)	2050 Pop. Equiv. Served	2050 ADF (mgd)	2050 WWPF (mgd)
SINKING CREEK WWTP	**54**	**120**	**76,626**	**10.6**	**37.4**	**165,210**	**23.6**	**70.8**	**326,500**	**47.1**	**141.3**
Sinking Creek	30	11.9	32,528	4.2	12.7	48,439	6.3	18.9	73,112	9.5	28.5
Bushman Creek	18	3.3	11,279	1.5	4.4	20,426	2.7	8.0	38,165	5.0	14.9
Northeast	18	3.3	5,830	0.8	2.3	8,500	1.1	3.3	10,425	1.4	4.1
VA	21	3	7,372	1.0	2.9	10,298	1.3	4.0	12,822	1.7	5.0
Stones River	42	20.6	43,035	5.6	16.8	85,523	11.1	33.4	146,031	19.0	57.0
Lower Lytle	21	3.2	6,425	0.8	2.5	7,418	1.0	2.9	8,050	1.0	3.1
Lower Lytle-2	30	6.5	13,183	1.7	5.1	22,084	2.9	8.6	44,011	5.7	17.2
Upper Lytle	30	6.5	2,261	0.3	0.9	8,945	1.2	3.5	30,771	4.0	12.0
Bradyville Rd	24	4.6	9,848	1.1	3.3	11,565	1.5	4.5	12,490	1.6	4.9
Stones River Ext	30	6.5	19,049	2.4	7.2	50,842	6.6	19.8	88,805	11.5	34.6
Southwest	21	3.2	18,331	1.7	5.0	49,912	6.5	19.5	87,660	11.4	34.2
Southwest Relief	18	2.3	11,633	1.5	4.5	35,816	4.7	14.0	69,778	9.1	27.2
Samsonite Relief	21	4	5,328	0.7	2.1	11,362	1.5	4.4	16,282	2.1	6.4
Overall Creek	36	16.5	1,063	0.1	0.4	44,223	5.7	17.2	97,191	12.6	37.9

* Estimated from Population

3. EFFLUENT LIMITATIONS

On August 31, 2001 the Tennessee Department of Environment and Conservation (TDEC) issued a new National Pollutant Discharge Elimination System (NPDES) permit for the Sinking Creek Wastewater Treatment Plant. This permit superceded the previous permit issued on August 31, 1993. The new permit increased the allowable plant discharge flow rate from 8 mgd to 16 mgd. Limitations on the effluent quality were tightened significantly, however. Tables 3.1 and 3.2 summarize the primary criteria from both the 1993 and 2001 permits. The entire text of the 2001 NPDES is contained in Appendix A.

While not publicly documented, conversations with TDEC regulatory personnel indicate that the results of the present Total Maximum Daily Load (TMDL) study by the EPA will likely eliminate the possibility of increased mass loadings of BOD, TSS and ammonia on subsequent permits. In fact, the total mass loading limits were unchanged between the 1993 and 2001 permits. Because the discharge flow was doubled in the permit, the allowable concentrations of BOD and TSS were halved. It is therefore likely that future expansions of the Sinking Creek Wastewater Treatment Plant will require provisions to either dispose of effluent water through methods other than discharge to the West Fork of the Stones River, or to provide advanced treatment capable of further reducing the mass loading of these parameters in the discharge stream. Both of these possibilities were evaluated during preparation of this Facilities Plan Update.

3.1 Secondary Treatment

Due to the stringent nature of the 2001 NPDES permit limits, discharge of wastewater after secondary treatment is not an option. This is evident from evaluation of the DMR's for the old SCWWTP. Even with a properly operating Secondary Treatment process schematic, compliance with the new permit limitations could not be achieved reliably.

3.2 Advanced Treatment

The existing facilities at the SCWWTP provide for primary treatment through raw screening of particles greater that 0.06 millimeters and vortex grit removal of particles greater than 50 microns. Secondary treatment is provided through an oxidation ditch extended aeration process followed by gravity clarification. The effluent from these processes is then filtered through deep bed sand filters, exposed to ultraviolet (UV) disinfection, aerated and subsequently discharged into the West Fork of the Stones River. This advanced treatment process schematic has been successful at significantly reducing the waste loads discharged by the facility.

3.3 Land Application

It is anticipated that further expansion of the SCWWTP will require provisions to dispose of wastewater above and beyond the currently permitted 16 mgd through means other than discharge into the West Fork of the Stones River. Land application or other non-potable reuse of the plant effluent is one of the options evaluated during the course of this study. The limitations placed on effluent quality for disposal of this nature would likely not be any more stringent than that required under the 2001 NPDES permit. The only additional requirement anticipated would be the provision to add a secondary disinfectant to protect against microbial regrowth within the non-potable distribution system.

Numerous entities within the Planning Area have expressed interest in utilizing non-potable reuse water for activities such as irrigation, process water, and cooling tower water supply. These include the Veteran's Administration (VA) Golf Course, the Old Fort Golf Course, the proposed Medical Center, and the various City parks throughout Murfreesboro. Additional potential users include local sod farms, nurseries, industries, educational institutions and other commercial and residential entities. It will require consistent attention on behalf of the Murfreesboro Water and

Sewer Department to continually seek out new users of this system to match the continually increasing wastewater flows at the treatment plant. Additionally, dedicated land application sites should be acquired for use during periods when the demand for non-potable reuse water does not meet the production of the treatment plant. It is advisable that the Murfreesboro Water and Sewer Department initially focus on City-owned or controlled properties for these sites, however acquisition of additional tracts will likely become necessary as effluent flow rates at the plant increase. Anticipated costs of implementation for non-potable reuse systems are discussed in Sections 7 & 8.

Table 3.1
1993 NPDES Permit for the Sinking Creek Wastewater Treatment Plant

Effluent Characteristics	**Effluent Limitations**						**Monitoring Requirements**		
	Monthly Average Conc. (mg/l)	Monthly Average Amount (lb/day)	Weekly Average Conc. (mg/l)	Weekly Average Amount (lb/day)	Daily Maximum Conc. (mg/l)	Daily Minimum Percent Removal	Measurement Frequency	Sample Type	Sampling Point
$CBOD_5$	10 Report	667	15	1000	20 Report	40	5/week 5/week	Composite Composite	Effluent Influent
Ammonia as N (May 1 - Oct 31)	2.0 Report	133	3.0	200	4.0 Report		5/week 5/week	Composite Composite	Effluent Influent
Ammonia as N (May 1 - Oct 31)	5.0 Report	334	7.5	500	10.0 Report		5/week 5/week	Composite Composite	Effluent Influent
Suspended Solids	30 Report	2001	40	2669	45 Report	40	5/week 5/week	Composite Composite	Effluent Influent
96 LC50					100%		1/ 6 Months	Composite	Effluent
NOEC					85%		1/ 6 Months	Composite	Effluent
Chromium, T	0.054	3.6			Report	Report	1/ Month	Composite	Effluent
Copper, T	Report	Report			Report	Report	1/ Month	Composite	Effluent
Cyanide, T	0.006	0.4			Report	Report	1/ Month	Composite	Effluent
Lead, T	0.011	0.7			Report	Report	1/ Month	Composite	Effluent
Zinc, T	Report	Report			Report	Report	1/ Month	Composite	Effluent

Table 3.1 (Cont'd)
1993 NPDES Permit for the Sinking Creek Wastewater Treatment Plant

Effluent Characteristics	**Effluent Limitations**			**Monitoring Requirements**		
	Monthly Average	Daily Minimum	Daily Minimum	Measurement Frequency	Sample Type	Sampling Point
Fecal Coliform	200/100 ml (see the following paragraphs)		1000/100 ml	5/week	Grab	Effluent
Chlorine Residual (Total)			0.02 mg/l instantaneous	5/week	Grab	Effluent
Settlable Solids			1.0 ml/l	5/week	Composite	Effluent
Dissolved Oxygen		6.0 mg/l instantaneous		5/week	Grab	Effluent
pH (Standard Units)		6.0	9.0	5/week	Grab	Effluent

Table 3.2
2001 NPDES Permit for the Sinking Creek Wastewater Treatment Plant

Effluent Characteristics	**Effluent Limitations**						**Monitoring Requirements**		
	Monthly Average Conc. (mg/l)	Monthly Average Amount (lb/day)	Weekly Average Conc. (mg/l)	Weekly Average Amount (lb/day)	Daily Maximum Conc. (mg/l)	Daily Minimum Percent Removal	Measurement Frequency	Sample Type	Sampling Point
$CBOD_5$ (May 1 - Oct 31)	5 Report	667	7.5	1001	10 Report	40	7/week 7/week	Composite Composite	Effluent Influent
$CBOD_5$ (Nov 1 - Apr 30)	10 Report	1334	15	2002	20 Report	40	7/week 7/week	Composite Composite	Effluent Influent
Ammonia as N (May 1 - Oct 31)	1	133	1.5	200	2		7/week	Composite	Effluent
Ammonia as N (Nov 1 - Apr 30)	2.2	294	3.3	440	4.4		7/week	Composite	Effluent
Nitrogen, Total*	9.0	1201					2/month	Composite	Effluent
Nitrite plus nitrate	Report						2/month	Composite	Effluent
Kjeldahl Nitrogen, Total	Report						2/month	Composite	Effluent
Suspended Solids	30 Report	4003	40	5338	45 Report	40	7/week 7/week	Composite Composite	Effluent Influent

Table 3.2 (Cont'd)
2001 NPDES Permit for the Sinking Creek Wastewater Treatment Plant

Effluent Characteristics	**Effluent Limitations**			**Monitoring Requirements**		
	Monthly Average	Daily Minimum	Daily Minimum	Measurement Frequency	Sample Type	Sampling Point
Fecal Coliform	200/100 ml (see the following paragraphs)		1000/100 ml	7/week	Grab	Effluent
Dissolved Oxygen		6.0 mg/l Instantaneous		7/week	Grab	Effluent
pH (Standard Units)		6.0	9.0	7/week	Grab	Effluent
Settleable Solids			1.0	1/week	Composite	Effluent
Flow (MGD)	Report Report		Report Report	7/week 7/week	Continuous Continuous	Influent Effluent
IC_{25} (May 1 - Oct 31)	Survival, reproduction and growth in 99% concentration			1/quarter	Composite	Effluent
IC_{25} (Nov 1 - Apr 30)	Survival, reproduction and growth in 74% concentration			1/quarter	Composite	Effluent

4. EXISTING CONDITIONS

The process of expansion began for the Sinking Creek Wastewater Treatment Plant in 1992 in response to a Commissioner's Order from the State of Tennessee Bureau of Environment. This Order resulted from bypasses of sewage from the collection system and violations of the treatment plant's NPDES permit. Rapid growth within the sewage service area coupled with more stringent discharge criteria had basically overwhelmed the existing treatment works. In response, the City of Murfreesboro began a capital improvements program to replace the aged treatment works with a system that would be capable of meeting more stringent discharge criteria and providing a degree of redundancy not possible with the existing treatment system. The result was construction of a state-of-the-art treatment plant including several innovative processes for the inactivation of pathogens, the removal of objectionable matter from the waste, and the management of residuals from the plant. This new facility has been online since January 2000, and is exceeding its design parameters on a daily basis.

4.1 Existing Wastewater Flows and Treatment System Performance

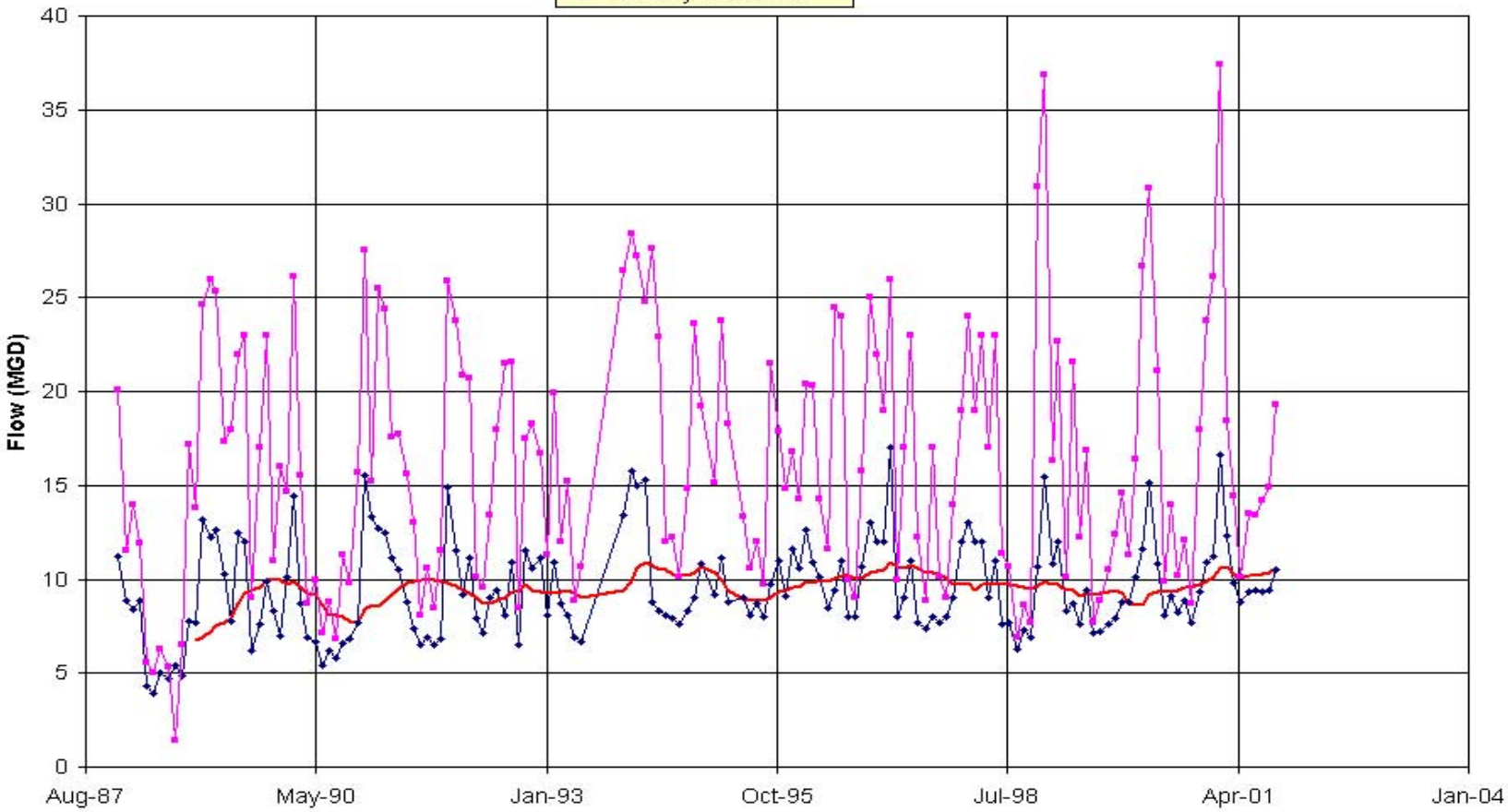
While the population of the City of Murfreesboro has consistently outpaced growth projections year after year, the average flows the treatment plant have appeared to stagnate. This trend is illustrated in Figure 4.1. There are several possible explanations as to this anomaly. It is likely that the Murfreesboro Water and Sewer Department's (MWSD) efforts to reduce Infiltration and Inflow (I/I) from the collection system are manifesting as a reduction in the average flow to the treatment works. Reductions of extraneous flows have been documented in areas receiving consistent rehabilitation efforts were identified in Section 4 of Volume I of this Facilities Plan. Another possible explanation could be the shortage of rainfall experienced over the last several years. A third explanation could be that consumers are more aware and conservative of wasting water with the increasing costs of treating and supplying drinking water. In any case, it is likely that these

flows will again start to increase as the population of Murfreesboro continues to grow and new service areas are added.

In contrast to the stagnate flowrates received at the Sinking Creek Wastewater Treatment Plant, the strength of the wastewater has increased significantly over the last ten years. At the time of the 1992 Revision of the 201 Facilities Plan, the average BOD, NH4 and TSS strength experienced at the plant were approximately 145 mg/L, 11.5 mg/L and 133 mg/L respectively. Each of these parameters has increased since that time to their present averages of 235 mg/L, 16.6 mg/L, and 237 mg/L respectively for the period of January 2000 through present. It was considered conservative during preparation of the 1992 Revision to utilize concentrations of BOD, NH4 and TSS of 200 mg/L, 16 mg/L and 200 mg/L respectively for the design of the treatment facilities. In actuality, the consistent increase in waste strength has already exceeded the design concentrations for the plant. This point is discussed further in Section 6.

Construction on the replacement facilities at the Sinking Creek Wastewater Treatment Plant were completed in January 2000 and subsequently placed online. The effectiveness of the treatment works were immediately visible on the Discharge Monthly Report (DMR) with respect to BOD and TSS. Due to the nature of the biological nitrification process, it was not until two months later that the effectiveness of the plant with respect to ammonia removal was evident. Table 4.1 summarizes treatment performance at the SCWWTP for the years 1999 through 2001. It is obvious from this data that the new treatment schemes were successful at greatly improving the effluent quality discharged into the West Fork of the Stones River. Average concentrations of BOD, NH4, and TSS were reduced significantly once the new plant was placed into operation. It is also important to note that some of the reported levels of effluent BOD and ammonia are at or below reliable measurement levels, and that the effluent is in some cases better than this data indicates. Appendix B contains DMR data from 1988 through present for applicable treatment parameters as well as graphical representations of this data.

Figure 4.1
Monthly Flow Data



4.2 Infiltration and Inflow

Infiltration and Inflow (I/I) is a problem that plagues essentially all older sewage collection systems. Murfreesboro's collection system is no exception. Flow data monitored at the wastewater treatment plant and at permanent monitoring sites throughout the collection system attest to this fact. As discussed at length in Section 4 of Volume I of this Facilities Plan, I/I reduction has been a constant goal of the Murfreesboro Water and Sewer Department since the early 1980's. Some of the earliest attempts at flow reduction were made within the Murfreesboro collection system during the Sanitary System Evaluation Survey's (SSES's) mandated by the EPA. Today, the Murfreesboro Water and Sewer Department continues these efforts and strives to comply with the provisions of the impending Capacity/ Maintenance Operation and Management (C/MOM) regulations promulgated by the EPA.

Table 4.1
Treatment Plant Performance (1999-2001)

DATE	EFFLUENT BOD (mg/L)	EFFLUENT BOD (lbs/d)	EFFLUENT TSS (mg/L)	EFFLUENT TSS (lbs/d)	EFFLUENT NH4 (mg/L)	EFFLUENT NH4 (lbs/d)
Jan-99	63	8123	63	8123	8	1083
Feb-99	46	4143	49	4414	10	901
Mar-99	54	5404	51	5104	8	801
Apr-99	35	2423	40	2769	12	831
May-99	31	2249	45	3265	17	1233
Jun-99	19	1204	36	2282	19	1204
Jul-99	27	2117	35	2744	8	627
Aug-99	8	474	24	1421	3	189
Sep-99	10	600	23	1381	3	150
Oct-99	18	1141	35	2218	11	691
Nov-99	21	1384	29	1911	13	883
Dec-99	23	1688	31	2275	9	675
NEW TREATMENT PLANT OPERATIONAL JANUARY 2000						
Jan-00	28	2055	32	2349	9	631
Feb-00	23	1937	14	1179	16	1314
Mar-00	6	580	6	580	14	1374
Apr-00	4	504	6	756	11	1385
May-00	2	180	1	90	2	216
Jun-00	2	135	2	135	0	7
Jul-00	1	76	2	152	0	8
Aug-00	2	137	3	205	0	7
Sep-00	2	148	1	74	0	7
Oct-00	2	128	1	64	0	6
Nov-00	2	155	3	233	0	8
Dec-00	2	182	1	91	1	55
Jan-01	1	93	1	93	1	47
Feb-01	2	277	1	138	0	28
Mar-01	2	205	2	205	0	21
Apr-01	2	163	1	82	0	8
May-01	1	73	1	73	0	7
Jun-01	2	155	1	78	0	8
Jul-01	1	78	1	78	0	8
Aug-01	2	155	1	47	0	8
Sep-01	1	78	1	78	0	16
Oct-01	2	175	1	96	0	9
1/99-12/99						
AVG	30	2579	38	3159	**10**	**772**
MAX	63	8123	63	8123	**19**	**1233**
MIN	8	474	23	1381	**3**	**150**
2/00-11/01**						
AVG	2	179	2	164	**0**	**15**
MAX	6	580	6	756	**1**	**55**
MIN	1	73	1	47	**0**	**6**

** The period of 1/01 through 2/01 is excluded from the Average/ Max/ Min calculations. The values are not representative due to the amount of time it took for the microorganisms to begin assimilation of the constituents.

5. FUTURE CONDITIONS

5.1 *Planning Period*

The 1992 revision of the Facilities Plan addressed both a planning period which included the period through 2013 and a study period which projected needs for the area through 2040. This update addresses a planning period through 2022 and a study period through 2050.

The Planning Area delineated under the 1992 Revision of the 201 Facilities Plan was modified recently to account for the Urban Growth Boundary approved in 2000. Additional area was added beyond the Urban Growth Boundary on the southern side of town to allow areas which can be served by gravity interceptors to be included in the planning process. Inadequate soils coupled with failing septic systems within Rutherford County has created a demand for sanitary sewer service within these areas. Exhibit 5.1 in Volume I illustrates this new Planning Area as well as the previous 201 Planning Area, the current City Limits, and the Urban Growth Boundary.

5.2 *Land Use Projections*

The City of Murfreesboro Planning Department has compiled the following historical information on land use trends in Murfreesboro:

Table 5.1
Historical Land Use

LAND USE	1958		1967		1984	
	Acres	% of totals	Acres	% of totals	acres	% of totals
Residential	1150.5	30.95	1904.1	32.40	3740.15	27.70
Commercial	92.3	2.48	156.1	2.66	861.97	6.39
Industrial	88.5	2.38	147.7	2.51	510.38	3.78
Institutional	500.00	13.45	576.4	9.81	1109.05	8.21
Streets & Hwys	473.3	12.73	766.5	13.04	1548.90	11.47
Open Space	1412.2	38.00				
TOTAL	3716.8 or 5.81 sq. mi.		5877.0 or 9.18 sq. mi.		13499.16 or 21.09 sq. mi.	

Current land use for the City of Murfreesboro is taken from the City's GIS and zoning ordinance. The land use is categorized by zoning district in Table 5.2. These zoning districts are grouped by major use. Table 5.3 indicates acreage by individual classifications.

Table 5.2
Existing Land Use

LAND USE	2001	
	ACRES	% OF TOTAL
Residential	18,043	67.83
Commercial	3,520	13.23
Industrial	3,690	13.87
Institutional	632	2.38
Parks/Open Space	715	2.69
Streets & Highways*	---	---
TOTAL	26,600 or 41.56 sq. mi.	

- included in major categories

The City has begun a process to identify potential land use for areas outside the current City limits, but inside the Urban Growth Boundary. The City of Murfreesboro Planning Department has undertaken two major suburban land use studies which are complete as of this date. The Blackman and Salem Road studies have been reviewed and recommendations from each have been used to develop this facilities plan.

Table 5.3
City of Murfreesboro Zoning

Zoning Code	Description	Total Acres
CBD	Central Business District	40
CF	Commercial Fringe District	170
CH	Highway Commercial District	2784
CL	Local Commercial District	162
CM	Medical District Commercial	60
CM-R	Medical District Residential	144
CM-RS8	Medical District Residential Single Family	5
CP	Commercial Park	74
CU	College & University District	631
H-I	Heavy Industrial District	2259
L-I	Light Industrial District	1431
OG	General Office District	184
OG-R	General Office District-Residential	61
P	Park	715
PCD	Planned Commercial District	47
PND	Planned Institutional District	1
PRD	Planned Residential District	416
PUD	Planned Unit Development	797
R-MO	Mobile Home District	70
RD	Duplex Residential District	341
RM-12	Single-Family Residential District	521
RM-16	Residential Multi-Family District	1256
RM-22	Residential Multi-Family District	30
RS-10	Single-Family Residential District	3305
RS-12	Single-Family Residential District	2143
RS-15	Single-Family Residential District	8020
RS-4	Single-Family Residential District	52
RS-8	Single-Family Residential District	355
RZ	Residential Zero-Lot Line District	526
	Total Acreage	**26,600**

5.3 *Population Forecast*

5.3.1 Background

Census figures for Murfreesboro and Rutherford County since the beginning of the last century have been as follows:

TABLE 5.4
Historical Population Data

YEAR	MURFREESBORO POPULATION	COUNTY POPULATION	RATIO CITY/COUNTY
1900	3,999	33,543	.119
1910	4,679	33,199	.141
1920	5,367	33,059	.162
1930	7,993	32,286	.248
1940	9,495	33,604	.283
1950	13,052	40,696	.320
1960	18,991	52,368	.363
1970	26,360	59,428	.444
1980	32,845	84,058	.391
1990	44,922	118,570	.379
2000	68,816	182,023	.378

Murfreesboro has shown sustained growth since 1900. From 1990 to 2000, the City's population increased 53.2% according to the U.S. Census Bureau. Murfreesboro is now the sixth largest city in the State, surpassing Jackson for the first time.

Rutherford County became the second most populous county in the Nashville Metropolitan Statistical Area (MSA) according to the 1990 census. From 1990 to 2000, the population of Rutherford County

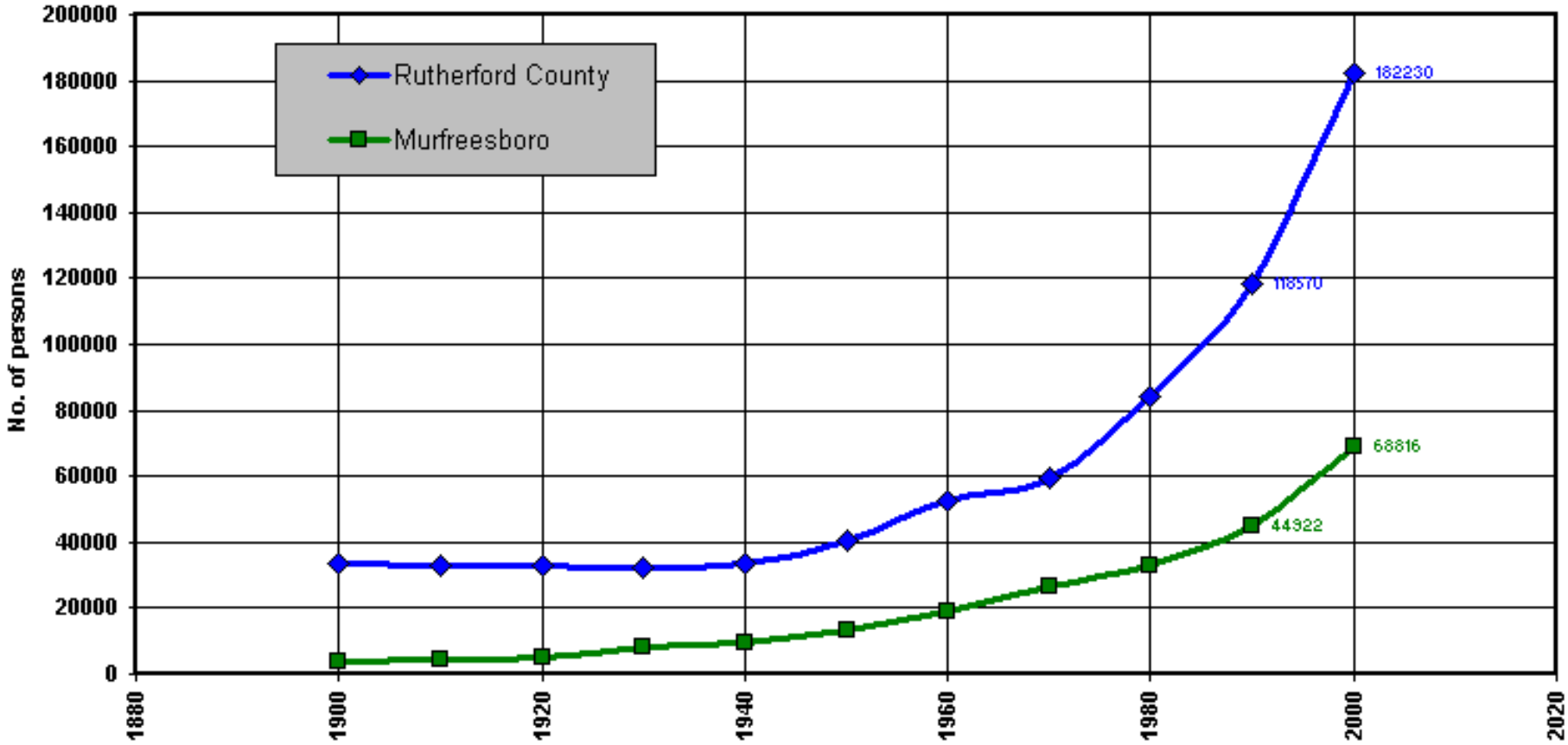
increased by another 53.5%. Rutherford County is now the fifth most populous county in the State of Tennessee.

Prior to the 1920's, Rutherford County was essentially an agricultural area, and Murfreesboro was a typical county seat, serving as the trading center for the region. With the opening of the large milk processing plants in Murfreesboro, the City changed from a trading center to a manufacturing center and the migration from the farms to the City began. During World War II, the Smyrna Air Base was constructed, and the county began to grow in the Smyrna area as well as in Murfreesboro. When the Air Base was closed in the 1960's, there was an adverse effect on the surrounding area. The county population growth essentially reflected the growth of Murfreesboro for the next decade. In fact, during the decade of the 1960's, the net increase in the county population was less than for the City of Murfreesboro. By the end of the 1960's, Murfreesboro had become firmly established as a manufacturing center and continued to grow.

The completion of Interstate Highway 24 led to a population explosion in the suburbs of Nashville. Rutherford County began growing at a rate equal to or greater than the sustained growth of Murfreesboro. The growth rate of Rutherford County was enhanced by the location of the Nissan truck assembly plant in the Smyrna area in 1983. LaVergne, located near the Davidson County line, also attracted several large industries during the 1970's. During the period from 1990 to 2000, the population of Rutherford County increased by 63,453 persons, while the population of Murfreesboro increased by 23,894 persons. The aggregate county growth rate and the growth of Murfreesboro were almost double that of the previous decade.

Figure 5-1 shows population growth for Murfreesboro and Rutherford County from the year 1900.

FIGURE 5-1
Historical Populations of
Rutherford County and Murfreesboro



5.3.2 Population Projections

The 1974 Facilities Plan population projections for Rutherford County were taken from an EPA report on “Population and Economic Activity in the US and SMSA”. This report showed the projected population of Rutherford County to be as follows:

TABLE 5.5
1974 POPULATION PROJECTIONS FOR RUTHERFORD COUNTY

YEAR	POPULATION
1980	70,500
1990	92,100
2000	113,700
2010	140,300
2020	170,800

The 1992 Update of the 201 made population forecasts based on input from various agencies including the Murfreesboro Planning Department, the State of Tennessee, and the Greater Nashville Regional Council. Population projections from the 1992 Report for the City, County, and expected sewer service area for the 20-year planning period area as well as the 50-year study area are shown below:

TABLE 5.6
1992 UPDATE POPULATION PROJECTIONS

YEAR	CITY OF MURFREESBORO POPULATION	RUTHERFORD COUNTY POPULATION	PLANNING/STUDY AREA POPULATION
2000	63,428	158,570	82,456
2010	79,440	198,600	103,272
2020	96,600	239,000	125,600
2030	112,000	280,000	145,600
2040	128,000	320,000	166,400

The 1992 Report predicted that Rutherford County would grow at the rate of 4,000 persons per year. The 2000 Census indicated that the County grew at a rate of 6,300 persons per year from 1990 to 2000. In consideration of recent economic developments and growth trends, it appears that the growth rate from 1990 to 2000 could be sustained. The ratio of City population as a proportion of County population remained constant from that of the 1990 census at .378. Using the 6,300 persons per year figure for County population growth and a .378 City to County ratio, the resulting projections are as follows:

TABLE 5.7
POPULATION PROJECTIONS ASSUMING 6,300
PPY GROWTH IN COUNTY

YEAR	CITY OF MURFREESBORO POPULATION	RUTHERFORD COUNTY POPULATION	% INCREASE
2000	68,816	182,023	
2010	92,600	245,000	34.6
2020	116,400	308,000	25.7
2030	140,200	371,000	20.5
2040	164,000	434,000	17.0
2050	187,900	497,000	14.5

In 1998, and again in 2001, the Murfreesboro Planning Department performed a detailed analysis of population growth patterns for Rutherford County and the City of Murfreesboro. This analysis included information obtained in the Special Census of 1994, 1996 and 1998, and the 2000 Census. Based on this data, the Planning Department projected that the City would grow at a variable rate of 2.3 to 5.2% per year and the County at a variable rate of 2.0 to 4.0% per year for the next twenty years. Population projection ranges from that report are shown below:

TABLE 5.8
2001 MURFREESBORO PLANNING DEPARTMENT PROJECTIONS

YEAR	CITY OF MURFREESBORO POPULATION	RUTHERFORD COUNTY POPULATION
2000	68,816	182,023
2010 Lower Limit Upper Limit	 99,294 101,694	 242,978 247,778
2020 Lower Limit Upper Limit	 128,094 140,574	 300,578 325,538

The Planning Department estimates should be considered the most reliable source for population projections. Therefore, the projections in this Report will be modeled around the average of the projections from the Planning Department.

The City of Murfreesboro generally provides wastewater collection and treatment services to people located within the City limits, plus about 1,000 customers outside the City. Present policy requires that any development requesting sewer service must also request annexation before the Murfreesboro Water and Sewer Department will provide sewer service to the development. Due to the extensive development that has been occurring outside the city limits and the need to provide a planned approach to providing wastewater services for these areas immediately adjacent to the city limits, it is suggested that capacity be provided in future wastewater system facilities to adequately handle the wastewater needs of the entire Urban Growth Boundary area.

The Urban Growth Boundary (UGB) was drawn with respect to certain physical boundaries, and previous 201 planning areas for the City. In light of the dwindling supply of land that is suitable for subsurfaced sewage disposal systems, watershed management initiatives and the high cost of retrofitting non-sewered areas with sewers, it is reasonable to include

areas that are contiguous to and naturally drain into the UGB as part of the updated 201 Planning Area. Not all of the areas draining into the UGB area are expected to develop and have City services. For the purposes of this Report, the areas outside the UGB which will be planned for service are shown on Exhibit 5.1 in Volume I.

The existing population data for the UGB and extended service area are taken directly from the 2000 Census tracts. This data has been added to the population data for the City to determine the planning/study area population. Using the Murfreesboro Planning Department's projections, the expected population for the City, County and Planning Area are as follows:

TABLE 5.9
2002 UPDATE POPULATION PROJECTIONS

YEAR	CITY OF MURFREESBORO POPULATION	RUTHERFORD COUNTY POPULATION	PLANNING/STUDY AREA POPULATION
2000	68,816	182,023	112,343
2010	100,500	245,400	151,500
2020	134,300	313,000	193,200
2030	170,000	385,000	237,600
2040	206,000	457,000	282,000
2050	242,000	529,000	326,500

5.4 Flow Reduction

The Murfreesboro Water and Sewer Department has encouraged its customers to limit water usage for many years. Water conservation through the use of low-flow household fixtures has been staples of new construction in Murfreesboro for many years. Industries are likewise encouraged to limit water usage through recycling and looped systems.

The Murfreesboro Water and Sewer Department also reduces flow through its I/I elimination program. Since 1980, the Department has consistently pursued I/I reduction through a number of programs. These are detailed in Section 4 of Volume I.

5.5 Forecast of Flow and Waste Load

Flow forecasts for the planning period and study period are indicated in Table 2.1 for the Interceptor Sewer System. Existing and projected sewage flows and waste loads are indicated in Table 5.10. As discussed in Section 4.1, the concentrations of BOD and TSS have increased markedly over the last several years. The Murfreesboro Water and Sewer Department has identified several contributors of excessive strength waste and is working to limit contributions from those sources. Additionally, it is recommended that the Murfreesboro Water and Sewer Department undertake a system-wide study to isolate other dischargers of excessive-strength wastewater. While there has been a nationwide trend of increasing wastewater strengths with respect to BOD, TSS, and ammonia, the rapid nature of the increases in the Murfreesboro sewer system are indicative of several point source dischargers. Modification of the Sewer Use Ordinance and stringent enforcement actions may be necessary to reduce loadings to within the design limitations at the treatment plant. It is assumed that these efforts will be successful, and that future concentrations of BOD and TSS will be 300 mg/L or lower at the treatment plant. These values are the basis of the mass loading projections tabulated in Table 5.10.

Table 5.10
Historical and Projected Flows and Waste Loads

YEAR	AVERAGE DAILY FLOW	AVERAGE BOD LOAD (lbs/day)	AVERAGE TSS LOAD (lbs/day)	AVERAGE AMMONIA LOAD (lbs/day)
1990	8.4	11,873	10,116	949
2000	9.9	19,427	18,107	1,346
2020	23.7	59,297	59,297	3,953
2050	47.1	117,844	117,844	7,856
Existing Plant Design	**16.0**	**26,000**	**26,000**	**2,669**

6. DEVELOPMENT OF ALTERNATIVES

The continued growth of the residential and commercial populations within the Murfreesboro City Limits and planned service area will undoubtedly necessitate expansion and/or modification of the Sinking Creek Wastewater Treatment Plant. Determination of future needs for the facility will be influenced heavily by the results of the TMDL study currently being performed by the Tennessee Department of Environment and Conservation (TDEC) and the EPA. For the purposes of evaluation of options within this Facilities Plan Update, it is assumed that the current mass loadings permitted for the SCWWTP will not be increased under any subsequent permits. The possibility exists, however, that TDEC may reduce the loading now afforded to the SCWWTP. Reevaluation of alternatives will be required if this possibility comes to pass.

6.1 Optimum Performance of Existing Facilities

The Sinking Creek Wastewater Treatment Plant was designed to treat an average daily flow rate of 16 mgd and a peak instantaneous flow rate of 40 mgd. It is important to keep in mind however, that the unit processes throughout the plant each have varying individual average and peak capacities. Table 6.1 summaries the design parameters and basis of design for each of these unit processes.

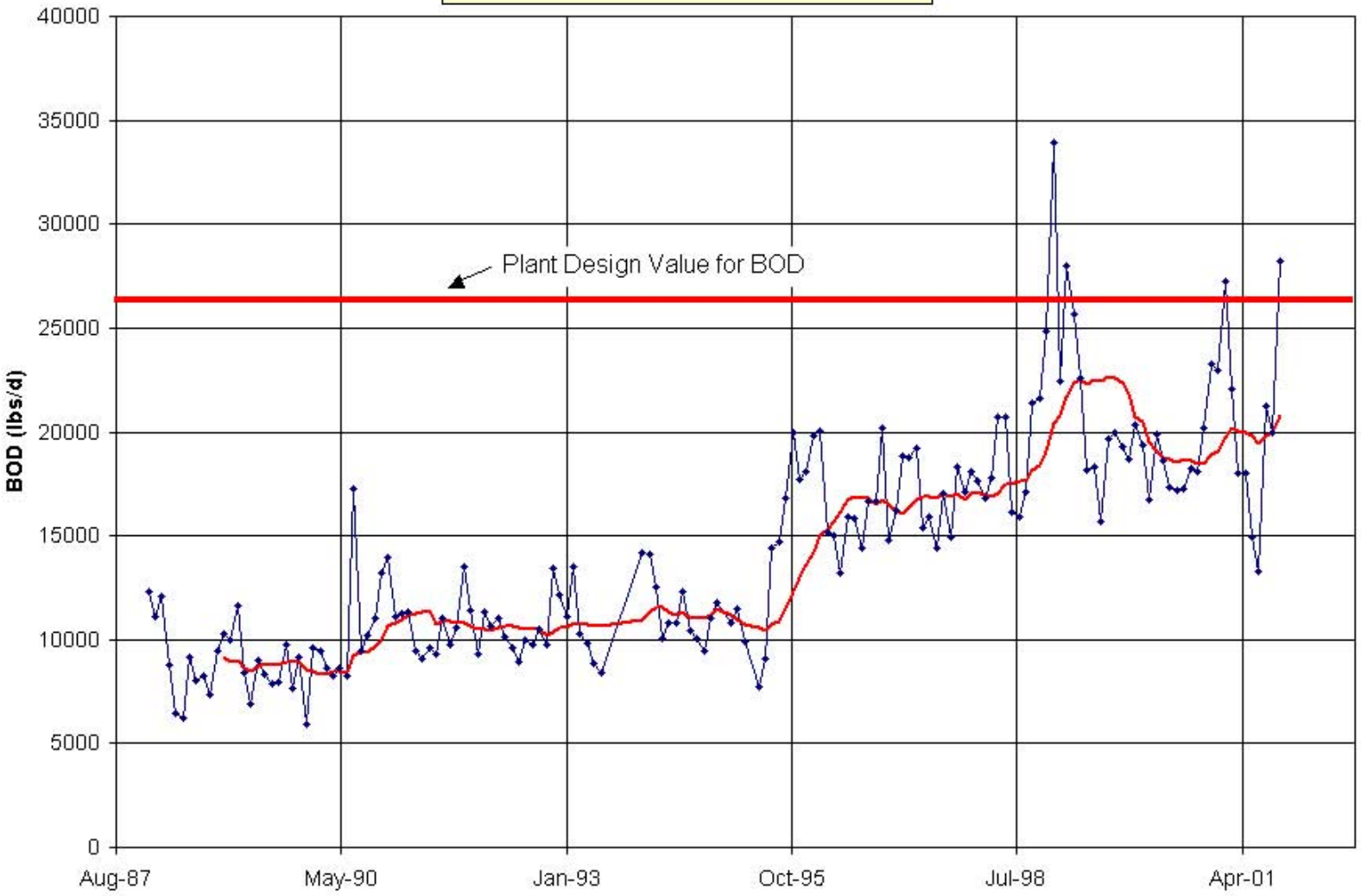
As mentioned in Section 4, the strength of the wastewater in the Murfreesboro collection system has consistently increased over the last ten years. This fact is evidenced in Figures 6.1 through 6.3, which illustrate the influent BOD, TSS and ammonia, respectively, monitored at the treatment plant from 1987 through the present. During design of the treatment plant, it was assumed that the BOD concentration would average 200 mg/L and the TSS concentration would average 200 mg/L. This corresponds to a design maximum daily loading on the extended aeration process of 26,000 pounds per day of BOD and TSS at 16 mgd. At the time, these assumptions were reasonable based upon available wastewater quality data. The steady increase of waste strength since 1995 causes concern as the average

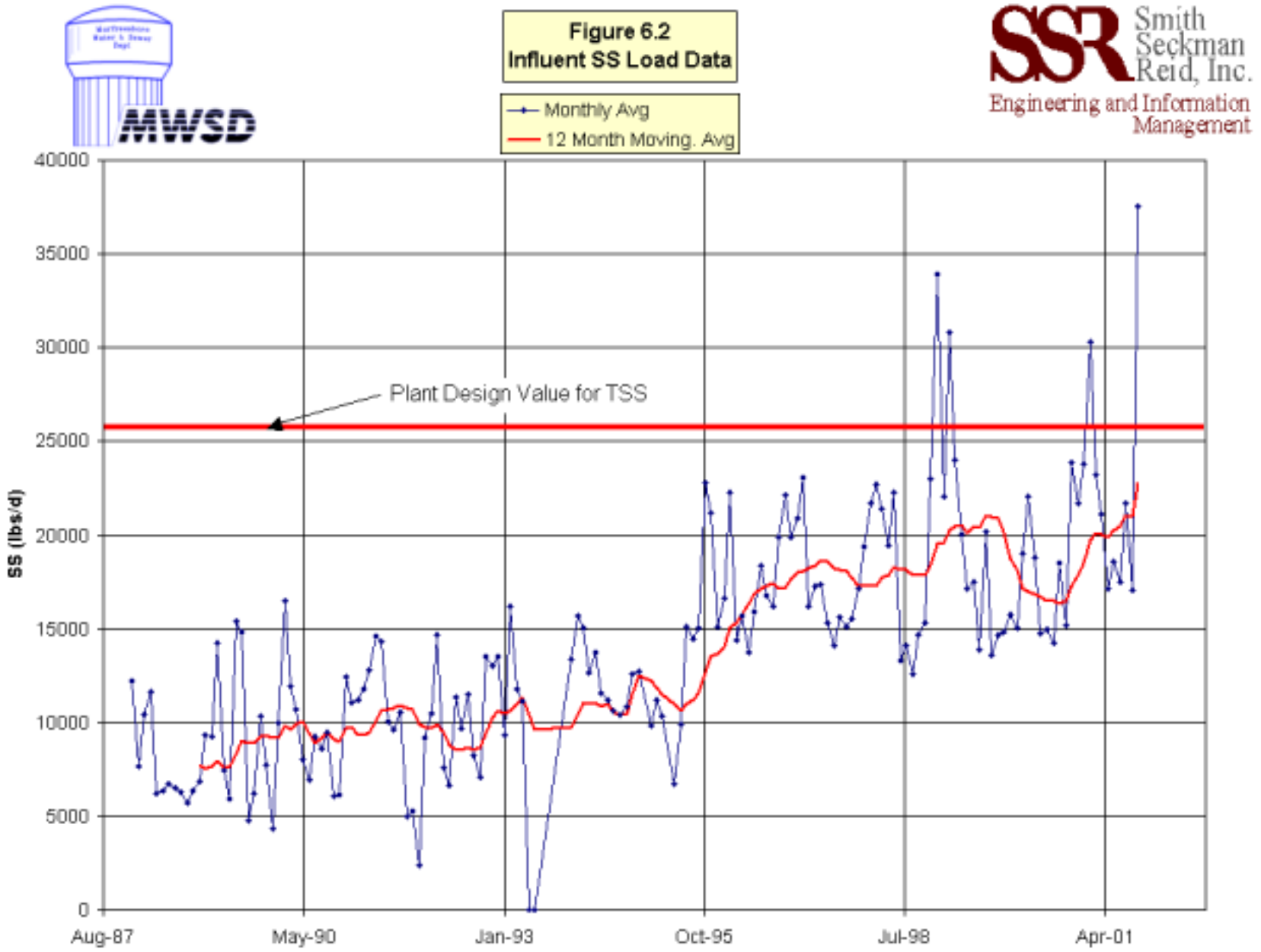
flow rate to the plant increases. The SCWWTP has already reached the design mass loading on the oxidation ditches on occasion since it began operation in 2000. While redundant capacity was provided in the design of these basins, continued operation at these levels was not anticipated during design. The possibility exists that additional aeration capacity will be required in the existing basins to maintain the effluent quality now afforded by the process.

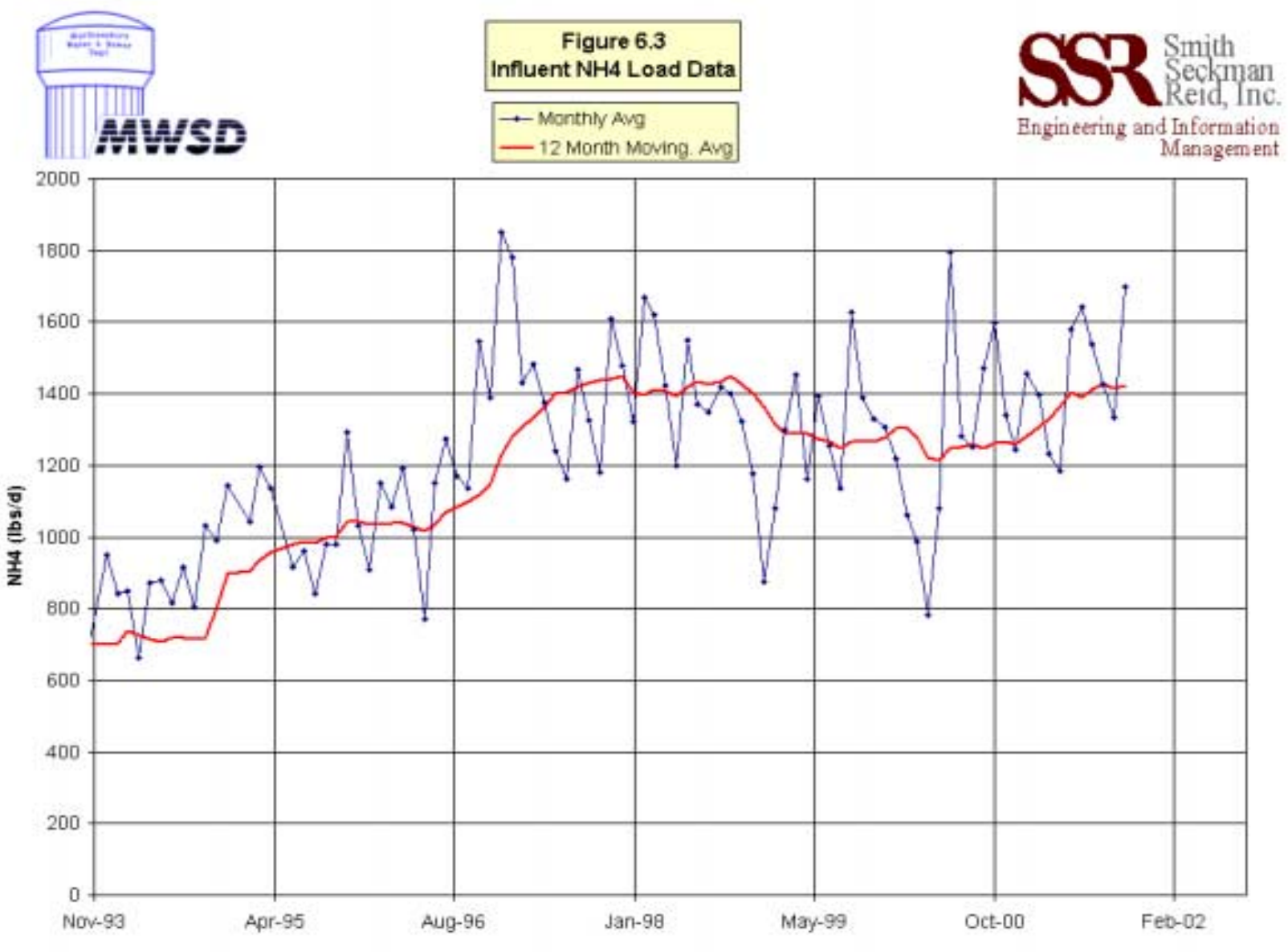
Table 6.1
Design Performance of Major Unit Processes

Location	Process	Average Capacity	Peak Capacity	Basis of Limitation
Influent Pump Station	Junction Box	N/A	100 mgd	Max capacity of 54" Influent Line
	Pump System	16 mgd	52 mgd	Capacity of existing 4 pumps w/ 1 out of service
Headworks	Raw Screens	16 mgd	40 mgd	Capacity of 3 units
	Vortex Grit Basin	16 mgd	60 mgd	Capacity of 2 units
Secondary Treatment	Oxidation Ditch	16 mgd	40 mgd	8 mgd per basin at 200 mg/L BOD, 200 mg/L TSS
	Clarifiers	16 mgd	40 mgd	605 gpd/sf at 40 mgd
Tertiary Treatment	Deep Bed Sand Filtration	16 mgd	40 mgd	6.12 gpm/sf @ 40 mgd
	UV System	16 mgd	40 mgd	20 mgd/ channel
	Post Aeration	16 mgd	40 mgd	20 min of detention time, 2500 lbs/ hr of aeration capacity
Residual Management	Biosolids Handling	16 mgd	40 mgd	3 days of storage time
	Biosolids Dewatering	16 mgd	40 mgd	20,000 lbs/d of solids (dry wt) 200,000 lbs/d of sludge to landfill

Figure 6.1
Influent BOD Load Data




MWSD
Figure 6.2
Influent SS Load Data
Monthly Avg
12 Month Moving. Avg
SSR
Smith
Seckman
Reid, Inc.
Engineering and Information
Management
Plant Design Value for TSS
SS (lbs/d)
40000
35000
30000
25000
20000
15000
10000
5000
0
Aug-87
May-90
Jan-93
Oct-95
Jul-98
Apr-01


MWSD
Figure 6.3
Influent NH4 Load Data
Monthly Avg
12 Month Moving. Avg
SSR
Smith
Seckman
Reid, Inc.
Engineering and Information
Management
NH4 (lbs/d)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Nov-93
Apr-95
Aug-96
Jan-98
May-99
Oct-00
Feb-02

6.2 Unsewered Areas

Currently, only about 3% of the area within the Murfreesboro City Limits is not served by sanitary sewer service. Service to most of these areas is already under development by the MWSD. It is also the intent to provide sanitary sewer service to residents living within the proposed Planning Area of the MWSD. This is covered extensively in Volume I- Sections 3 and 7 of this Facilities Plan.

6.3 Conventional Sewers

The Murfreesboro Water and Sewer Department currently owns and operates approximately 1.8 million lineal feet of gravity collection system. This value will continue to increase as the Department extends service to residents within the Planning Area. This is covered extensively in Volume I- Sections 3 and 7 of this Facilities Plan.

6.4 Alternative Conveyance Systems

The Murfreesboro Water and Sewer Department currently owns and operates 34 sewage lift stations and approximately 101,000 lineal feet of force mains. These values will continue to increase as the Department extends service to residents within the Planning Area. This is covered extensively in Volume I- Sections 3 and 7 of this Facilities Plan.

6.5 Interceptor Sewers

Wastewater is collected and conveyed to the Sinking Creek Wastewater Treatment Plant via a system of 13 major interceptor sewers. These interceptors are described in detail within Volume I- Section 3 of this Facilities Plan.

6.6 Innovative and Alternative Technologies

The Murfreesboro Water and Sewer Department strives to remain at the forefront of technology with respect to wastewater treatment. Many of the systems installed within the Sinking Creek Wastewater Treatment Plant are among the first of their kind in the State of Tennessee. These processes include the use of deep bed sand filters, medium pressure ultraviolet light for disinfection of the effluent stream, the use of rotary presses to dewater biosolids, and the use of extensive SCADA systems for the monitoring and control of the treatment works. It is the intent of the Murfreesboro Water and Sewer Department to continue to utilize all Best Available Technologies (BATs) to ensure consistent compliance with emerging treatment requirements. It is anticipated that additional innovative technologies such as membrane filtration, onsite hypochlorite generation, and non-potable reuse systems may be incorporated into the operations of the SCWWTP.

6.7 Biosolids Disposal

Disposal of biosolids has been an issue that has challenged all publicly owned treatment works and the Sinking Creek Wastewater Treatment Plant is no exception. Prior to the construction of the new treatment facilities, biosolids were thickened, stabilized and disposed of at a dedicated land application site. This procedure became impractical as land costs increased dramatically in response to the popularity of the area for residential development. An evaluation of available options led to the current practice of landfilling the wastewater plant biosolids.

Solids from the four clarifiers are wasted hourly into one of two sludge holding basins. The sludge is then conveyed to the Biosolids Building for dewatering. An innovative rotary press system is utilized for dewatering. It is consistently producing solids concentrations on the order of 12% solids and is capable of concentrations of 15 to 18% solids. The dewatered biosolids are then trucked to the BFI Middlepoint landfill on the north side of the City for ultimate disposal. The sludge is tested daily

to ensure compliance with the Paint Filter test provisions of their disposal contract. Additional capacity at the Biosolids Building will be necessary as the SCWWTP continues to grow.

6.8 Identification of Principal Alternatives

Continued growth of the City of Murfreesboro is a given. The popularity of this area has been well documented and recent growth has outpaced expert projections time and again. It is prudent to prepare for continued growth and to make decisions that will allow the City to flourish. For these reasons, a series of possible alternatives were identified and evaluated for the City of Murfreesboro's collection system and the Sinking Creek Wastewater Treatment Plant. These alternatives include:

1. **No Action-** Significant growth is projected for the Planning Area over the next twenty years. While the existing treatment facility is operating well at present, it is not designed for the flow rates projected. For this reason, the "No Action" alternative is not considered a viable solution to Murfreesboro's needs as a City.

2. **Expansion of the SCWWTP to 24 mgd with all effluent exceeding the permitted 16 mgd being pumped to the Cumberland River-** Under this alternative, an additional treatment train would be constructed parallel to the existing treatment works. This expansion would entail the installation of additional pumping facilities at the Influent Pump Station, construction of a duplicate headworks facility, construction of one oxidation ditch, two clarifiers, and additional filter building, and the installation of additional disinfection and aeration equipment. An effluent pump station would be constructed that would be capable of conveying all flow above the permitted 16 mgd through a 36 mile pipeline to a discharge point on the Cumberland River.

3. **Expansion of the SCWWTP to 24 mgd with all effluent exceeding the permitted 16 mgd being pumped to a submerged discharge into the J. Percy Priest Reservoir-** This alternative is similar to Alternative 1 with the exception that the pipeline would discharge into J. Percy Priest via a deep submerged outlet structure.

4. **Expansion of the SCWWTP to 24 mgd with all effluent exceeding the permitted 16 mgd being pumped into a nonpotable reuse distribution system-** Expansion of the SCWWTP would be similar in this alternative to Alternatives 1 & 2, however disposal of the additional effluent would be accomplished through non-potable reuse. A separate non-potable reuse piping network would be constructed in a phased approach throughout the City, affording users a lower cost alternative for uses such as irrigation, process water, cooling tower water, etc.

5. **Expansion of the SCWWTP to 24 mgd with the addition of advanced treatment technologies that could allow the effluent to remain within the TMDL permit limits at the higher discharge flow-** The existing treatment facilities at the Sinking Creek Wastewater Treatment Plant are already producing one of the purest effluents in the Southeast United States. Construction of additional advanced treatment processes could further lower concentrations of permitted pollutants and allow higher volumetric discharges with reduced mass loading discharges to the West Fork of the Stones River.

6. **Construction of a new 8 mgd advanced treatment/zero discharge facility in the southwestern corridor of town-** The bulk of new growth in the City of Murfreesboro appears to be in the vicinity of several proposed Interstate Highway exits in the southern corridor of town. Construction of a new 8mgd advanced treatment plant would alleviate the need to collect and convey wastewater from this area to the existing treatment plant, and then convey reuse water back to the area. This treatment plant would incorporate several

advanced treatment processes that would ensure drinking water quality in the non-potable reuse distribution network.

Each of these alternatives are thoroughly evaluated in Section 7 for ease of implementation, cost effectiveness, feasibility, and environmental impacts.

7. EVALUATION OF PRINCIPAL ALTERNATIVES

Continued Growth in the Murfreesboro Water and Sewer Department jurisdiction will undoubtedly require additions to the Sinking Creek Wastewater Treatment Plant. The evaluation of any alternative for the treatment plant should be predicated upon guidance from the Tennessee Department of Environment and Conservation (TDEC). At present time, however, TDEC is in the midst of completing the Total Maximum Daily Loading (TMDL) Study on each of the receiving streams in the State. The results of this study on the West Fork of the Stones River will determine future treatment requirements for the SCWWTP. Recent meetings with TDEC indicate that while the exact provisions of the TMDL study are not yet known, it is reasonable to assume that the currently permitted mass loadings (identified in Section 3) will not be increased for the SCWWTP. For the purposes of this report, it is therefore assumed that while the volumetric flow rate of effluent can be increased indefinitely into the West Fork of the Stones River, the mass loading of BOD, TSS and ammonia can not exceed the requirements of the 2001 NPDES permit.

Consequently, the five alternatives identified in Section 6 were evaluated on the basis of cost effectiveness, engineering feasibility, environmental impacts, and implementability. Exhibits 7.1 through 7.4 depict each of the alternatives graphically.

7.1 Monetary Evaluation

Each of the five alternatives were evaluated on the basis of both capital costs and anticipated operating costs over a twenty year period. Table 7.1 summarizes the outcome of the benefit to cost analysis. Tables 7.2 through 7.8 detail the estimated construction and operating costs associated with the major unit processes of each of the five alternatives. Operating costs were correlated to the actual budget for the Sinking Creek Wastewater Treatment Plant. This budget is included as Appendix C.

From this analysis, it is evident that the capital costs associated with the construction and operational costs associated with discharging into either the Cumberland River or J. Percy Priest Reservoir would be prohibitive. Similarly, the additional capital expense of constructing a new plant at a separate site coupled with the need to hire additional employees would exclude this option from further discussion. The two remaining alternatives that appear viable, therefore, would be the disposal of effluent into a non-potable reuse system or the advanced treatment of the effluent for disposal into the West Fork of the Stones River.

It is important to note that two items were not included in the evaluated cost of the reuse system. These two items are irrigation systems and land costs. It should be the goal of the Murfreesboro Water and Sewer Department to attract customers for non-potable reuse water. These customers will receive reuse water at a lower price than potable water, but will be required to install the onsite distribution and irrigation systems themselves. Due to the rising cost of potable water treatment and distribution, this will be attractive to many businesses.

If the amount of demand for this resource does not equal the supply created at the wastewater treatment plant, the Department will have to procure dedicated sites for application of the balance of the effluent. The two effluent studies conducted for the Department indicated that approximately 80 to 100 acres of land would be required for every million gallons per day of effluent disposal. The Department would need to acquire this land and install a dedicated irrigation system. Typical costs for installing residential or commercial irrigation systems are approximately $4,000 to $5,000 per acre. This type of irrigation system would be adequate for irrigation of golf courses or City-owned parks. A more robust system would be recommended for dedicated disposal sites, however. These systems utilize studier components than the plastic construction typically used on residential/ commercial units. This type of irrigation system would cost approximately $7,000 to $9,000 per acre to install. The cost of land varies substantially throughout the Murfreesboro area and will need to be determined on a case-by-case basis.

Table 7.1
Present Worth Analysis of Alternatives

Design Flow (summer)	24 mgd
Electricity	0.05 $/KW-hr
Demand Charge	9.83 $/KW
Evaluated Rate of Return	7%
Evaluation Term	20 years

Alternative	Plant Capital ($)	Disposal Capital ($)	Plant Electric ($/yr)	Disposal Electric ($/yr)	Plant Chemicals ($/yr)	Disposal Chemicals ($/yr)	Misc. O&M ($/yr)
1	$30,778,675	$61,750,000	$1,167,316	$216,969	$193,605	$0	$111,250
2	$30,163,425	$37,375,000	$1,167,316	$95,001	$193,605	$0	$111,250
3	$31,586,225	$8,430,904	$1,167,316	$271,688	$193,605	$7,793	$111,250
4	$58,573,315	$0	$1,305,220	$0	$310,498	$0	$471,250
5	$44,502,445	$31,830,104	$1,514,288	$271,688	$193,605	$7,793	$239,250

Alternative	Total Capital ($)	Total Operating ($/yr)	P/A ($)	PW ($)
1	$92,528,675	$1,689,140	$17,894,775	$110,423,450
2	$67,538,425	$1,567,171	$16,602,637	$84,141,062
3	$40,017,129	$1,751,652	$18,557,021	$58,574,150
4	$58,573,315	$2,086,968	$22,109,374	$80,682,689
5	$76,332,549	$2,226,623	$23,588,878	$99,921,427

This assumes construction of Phases 1-S, 1-N and 2 of the reuse system only. A benefit of this option is that a great deal of the capital can be spread out as

Alternative	
1	Expand SCWWTP to 24 MGD, Pump to Cumberland
2	Expand SCWWTP to 24 MGD, Pump to Percy Priest
3	Expand SCWWTP to 24 MGD, Pump to Reuse System
4	Expand SCWWTP to 24 MGD, Provide Advanced Treatment
5	New 8 MGD Zero Discharge Facility

Table 7.2

Estimated Construction and Yearly Operating Expenses For Alternative 1

PLANT EXPANSION SUBTOTAL				**$30,778,675**
PUMP STATION MODIFICATIONS				**$399,850**
	ADD 6TH PUMP			165,600
	PIPING			135,000
	ELECTRICAL			99,250
Operating Costs	Electrical	1000	HP	326,748
	Odor Control Chemicals	365292	Pounds/ Year	27,397
NEW HEADWORKS				**$3,997,750**
	BUILDING			1,879,500
	SITE			361,500
	MICROSCREEN			838,000
	GRIT BASIN			215,000
	M,E,P			703,750
Operating Costs	Electrical	150	HP	49,012
	Grit Trucking	365	Manhours/Year	18,250
	Odor Control Chemicals	365292	Pounds/ Year	27,397
EXTENDED AERATION BASIN				**$5,114,750**
	STRUCTURE			2,448,000
	SITE			1,450,500
	AERATORS			250,000
	MIXERS			200,000
	PIPING			435,000
	ELECTRICAL			331,250
Operating Costs	Electrical	680	HP	222,189
	Odor Control Chemicals	365292	Pounds/ Year	27,397
PHOSPHOROUS BASIN				**$1,183,025**
	STRUCTURE			422,000
	SITE			231,000
	MIXERS			151,900
	PIPING			178,125
	ELECTRICAL			200,000
Operating Costs	Electrical	150	HP	49,012
	Odor Control Chemicals	365292	Pounds/ Year	27,397
CLARIFIERS (2)				**$5,108,500**
	STRUCTURE			1,688,000
	SITE			924,000
	MECHANISM, PUMPS, ETC			1,519,000
	PIPING			712,500
	ELECTRICAL			265,000
Operating Costs	Electrical	500	HP	163,374
FILTER BUILDING				**$5,427,800**
	BUILDING			1,453,000
	SITE			406,300
	FILTERS			1,983,500
	PIPING			855,000
	M,E,P			730,000
Operating Costs	Electrical	250	HP	20,422
METHANOL STORAGE				**$500,000**
	STRUCTURE			300,000
	CHEMICAL STORAGE			100,000
	CHEMICAL FEED			50,000
	M,E,P			50,000
Operating Costs	Process Chemicals	365292	Pounds/ Year	27,397

Table 7.2 (Cont'd)
Estimated Construction and Yearly Operating Expenses For Alternative 1

UV BASINS				**$1,348,000**
	STRUCTURE			100,000
	UV UNITS			948,000
	ELECTRICAL			300,000
Operating Costs	Electrical	630	HP	205,860
	Bulb Replacement	270	Bulbs per year	27,000
	Misc Maintenance	440	Manhours per year	22,000
POST AERATION				**$136,000**
	AERATORS			96,000
	ELECTRICAL			40,000
Operating Costs	Electrical	100	HP	32,675
EFFLUENT PUMPING				**$1,437,500**
	PUMPS			1,250,000
	ELECTRICAL			187,500
Operating Costs	Electrical	664	HP	216,969
BIOSOLIDS HOLDING (4)				**$4,620,000**
	STRUCTURE			3,000,000
	SITE			270,000
	MIXERS			250,000
	PUMPS			300,000
	PIPING			150,000
	ODOR CONTROL			500,000
	ELECTRICAL			150,000
Operating Costs	Electrical	100	HP	32,675
BIOSOLIDS DEWATERING				**$1,505,500**
	ROTARY PRESSES			1,018,000
	PIPING			275,000
	ELECTRICAL			212,500
Operating Costs	Electrical	200	HP	65,350
	Sludge Trucking	880	Manhours/Year	44,000
	Process Chemicals	1120228.8	Pounds/ Year	84,017
EFFLUENT DISPOSAL LINE SUBTOTAL				**$61,750,000**
60" PIPELINE	190,000	LF	325	61,750,000
TOTAL PROJECT COST				**$92,528,675**

Table 7.3
Estimated Construction and Yearly Operating Expenses For Alternative 2

PLANT EXPANSION SUBTOTAL (SAME AS OPTION 1 EXCEPT EFFLUENT PUMPING)				$30,163,425
EFFLUENT PUMPING				**$822,250**
	PUMPS			715,000
	ELECTRICAL			107,250
Operating Costs	Electrical	291 HP		95,001
EFFLUENT DISPOSAL LINE SUBTOTAL				$37,375,000
60" PIPELINE		115000 LF	325	37,375,000
TOTAL PROJECT COST				**$67,538,425**

Table 7.4
Estimated Construction and Yearly Operating Expenses For Alternative 3

PLANT EXPANSION SUBTOTAL (SAME AS OPTION 1 EXCEPT EFFLUENT PUMPING AND HYPOCHLORITE GEN				$31,586,225
EFFLUENT PUMPING				**$790,050**
	PUMPS, PIPING, VALVES, ETC			687,000
	ELECTRICAL			103,050
Operating Costs	Electrical	433	HP	141,582
HYPOCHLORITE GENERATION				**$1,455,000**
	STRUCTURE			800,000
	EQUIPMENT			480,000
	M,E,P			175,000
Operating Costs	Electrical	398	HP	130,106
	Process Chemicals	194822.4	lbs/d	7,793
EFFLUENT REUSE SYSTEM SUBTOTAL				$36,502,544

PHASE 1-N	24" PIPELINE	22761	LF	84	1,911,941
	ROAD CROSSINGS	2	LS	175,000	350,000
	CONTINGENCIES	25	%	565,485	565,485
	EASEMENTS	22761	LF	15	341,418
				TOTAL PHASE 1-N	**3,168,844**
PHASE 1-S	24" PIPELINE	14100	LF	84	1,184,400
	ROAD CROSSINGS	4	LS	175,000	700,000
	STORAGE TANK	1	LS	725,000	725,000
	CONTINGENCIES	25	%	652,350	652,350
	EASEMENT ALLOWANCE	14100	LF	15	211,500
				TOTAL PHASE 1-S	**3,473,250**
PHASE 2	24" PIPELINE	39000	LF	84	3,276,000
	ROAD CROSSINGS	4	LS	175,000	700,000
	STORAGE TANK	1	LS	725,000	725,000
	CONTINGENCIES	25	%	1,175,250	1,175,250
	EASEMENT ALLOWANCE	39000	LF	15	585,000
				TOTAL PHASE 2	**6,461,250**
PHASE 3	24" PIPELINE	79401	LF	84	6,669,684
	ROAD CROSSINGS	5	LS	175,000	875,000
	STORAGE TANK	1	LS	725,000	725,000
	CONTINGENCIES	25	%	2,067,421	2,067,421
	EASEMENT ALLOWANCE	79401	LF	15	1,191,015
				TOTAL PHASE 3	**11,528,120**
PHASE 4	24" PIPELINE	82259	LF	84	6,909,756
	ROAD CROSSINGS	5	LS	175,000	875,000
	STORAGE TANK	1	LS	725,000	725,000
	CONTINGENCIES	25	%	2,127,439	2,127,439
	EASEMENT ALLOWANCE	82259	LF	15	1,233,885
				TOTAL PHASE 4	**11,871,080**

TOTAL PROJECT COST	**$68,088,769**

Table 7.5
Estimated Construction and Yearly Operating Expenses For Alternative 4

PLANT EXPANSION SUBTOTAL (SAME AS OPTION 1 EXCEPT EFFLUENT PUMPING)				$30,778,675
MEMBRANE TREATMENT FACILITY SUBTOTAL				$27,794,640
BUILDING				5,812,000
SITE				812,640
MEMBRANE SYSTEM				18,000,000
PIPING				1,710,000
M,E,P				1,460,000
Operating Costs	Electrical	422	HP	137,904
	Chemicals	4003	lbs/day	116,893
	Membrane Accrual	10	%/yr	360,000
TOTAL PROJECT COST				**$58,573,315**

Table 7.6
Estimated Construction and Yearly Operating Expenses For Alternative 5

PLANT CONSTRUCTION COST SUBTOTAL				**$44,502,445**
CONTROL BUILDING & LAB				**$2,741,000**
	BUILDING			1,700,000
	SITE			531,000
	M,E,P			510,000
Operating Costs	Electrical	50	HP	1,634
	Lab and Maintenance Personnel	8320	Manhours/ Year	416,000
INFLUENT PUMP STATION				**$5,066,500**
	BUILDING			1,845,500
	SITE			531,000
	M,E,P			2,005,000
	PUMPS			685,000
Operating Costs	Electrical	500	HP	16,337
	Odor Control Chemicals	121764	Pounds/ Year	9,132
NEW HEADWORKS				**$3,997,750**
	BUILDING			1,879,500
	SITE			361,500
	MICROSCREEN			838,000
	GRIT BASIN			215,000
	M,E,P			703,750
Operating Costs	Electrical	50	HP	16,337
	Grit Trucking	365	Manhours/Year	18,250
	Odor Control Chemicals	121764	Pounds/ Year	9,132
EXTENDED AERATION BASINS (2)				**$5,839,750**
	STRUCTURE			3,173,000
	SITE			1,450,500
	AERATORS			250,000
	MIXERS			200,000
	PIPING			435,000
	ELECTRICAL			331,250
Operating Costs	Electrical	227	HP	74,063
	Odor Control Chemicals	121,764	Pounds/ Year	9,132
PHOSPHOROUS BASIN				**$1,183,025**
	STRUCTURE			422,000
	SITE			231,000
	MIXERS			151,900
	PIPING			178,125
	ELECTRICAL			200,000
Operating Costs	Electrical	50	HP	16,337
	Odor Control Chemicals	121764	Pounds/ Year	9,132
MEMBRANE FACILITY				**$12,641,320**
	BUILDING			4,250,000
	SITE			406,320
	FILTERS			6,400,000
	PIPING			855,000
	M,E,P			730,000
Operating Costs	Electrical	141	HP	45,968
	Chemicals	1334	lbs/day	38,964
	Membrane Accrual	10	%/yr	128,000
UV BASINS				**$1,614,800**
	STRUCTURE			328,000
	SITE			262,800
	PIPING/VALVES			250,000
	UV UNITS			474,000
	ELECTRICAL			300,000
Operating Costs	Electrical	210.00894	HP	68,620
	Bulb Replacement	200	Bulbs per year	20,000
	Misc Maintenance	1460	Manhours per year	73,000

Table 7.6 (Cont'd)
Estimated Construction and Yearly Operating Expenses For Alternative 5

POST AERATION			**$1,975,800**
	STRUCTURE		795,000
	SITE		484,800
	PIPING/VALVES		375,000
	AERATORS		96,000
	ELECTRICAL		225,000
Operating Costs	Electrical	33 HP	10,892

EFFLUENT PUMPING			**$586,500**
	PUMPS		510,000
	ELECTRICAL		76,500
Operating Costs	Electrical	433 HP	141,582
	Chlorine Addition	133.44 lbs/d	5,845

HYPOCHLORITE GENERATION			**$1,455,000**
	STRUCTURE		800,000
	EQUIPMENT		480,000
	M,E,P		175,000
Operating Costs	Electrical	398 HP	130,106
	Process Chemicals	194822 lbs/d	7,793

BIOSOLIDS HOLDING (2)			**$2,310,000**
	STRUCTURE		1,500,000
	SITE		135,000
	MIXERS		125,000
	PUMPS		150,000
	PIPING		75,000
	ODOR CONTROL		250,000
	ELECTRICAL		75,000
Operating Costs	Electrical	50 HP	16,337

BIOSOLIDS DEWATERING	.		**$5,091,000**
	BUILDING		2,239,000
	SITE		726,000
	ROTARY PRESSES		1,318,500
	PIPING		257,500
	M,E,P		550,000
Operating Costs	Electrical	67 HP	21,783

EFFLUENT REUSE SYSTEM SUBTOTAL (Same as Above)	$36,502,544

TOTAL PROJECT COST	**$81,004,989**

Table 7.7

Estimated Additional Construction and Yearly Operating Expenses For Phase V Expansion

PLANT EXPANSION SUBTOTAL			**$18,282,000**
PUMP STATION MODIFICATIONS			**$1,975,000**
	REPLACE PUMPS		1,350,000
	PIPING		500,000
	ELECTRICAL		125,000
Operating Costs	Electrical	1300 HP	424,772
	Odor Control Chemicals	365292 Pounds/ Year	27,397
ADDITIONAL HEADWORKS EQUIPMENT			**$2,616,750**
	BUILDING		-
	SITE		-
	MICROSCREEN		838,000
	GRIT BASIN		1,075,000
	M,E,P		703,750
Operating Costs	Electrical	300 HP	49,012
	Grit Trucking	730 Manhours/Year	18,250
	Odor Control Chemicals	487056 Pounds/ Year	9,132
EXTENDED AERATION BASIN			**$4,991,750**
	STRUCTURE		2,248,000
	SITE		1,487,500
	AERATORS		250,000
	MIXERS		200,000
	PIPING		475,000
	ELECTRICAL		331,250
Operating Costs	Electrical	920 HP	78,420
	Odor Control Chemicals	487056 Pounds/ Year	9,132
CLARIFIERS (2)			**$4,412,500**
	STRUCTURE		1,628,000
	SITE		957,000
	MECHANISM, PUMPS, ETC		850,000
	PIPING		712,500
	ELECTRICAL		265,000
Operating Costs	Electrical	667 HP	54,458
FILTER BUILDING			**$917,500**
	BUILDING		-
	SITE		-
	FILTERS		562,500
	PIPING		355,000
	M,E,P		-
Operating Costs	Electrical	500 HP	20,422
METHANOL STORAGE			**$150,000**
	STRUCTURE		0
	CHEMICAL STORAGE		100,000
	CHEMICAL FEED		50,000
	M,E,P		0
Operating Costs	Process Chemicals	487056 Pounds/ Year	9,132

Table 7.7 (Cont'd)
Estimated Additional Construction and Yearly Operating Expenses For Phase V Expansion

UV BASINS				**$1,248,000**
	STRUCTURE			-
	UV UNITS			948,000
	ELECTRICAL			300,000
Operating Costs	Electrical	630	HP	205,860
	Bulb Replacement	360	Bulbs per year	36,000
	Misc Maintenance	440	Manhours per year	22,000

BIOSOLIDS HOLDING (1)				**$1,540,000**
	STRUCTURE			1,000,000
	SITE			90,000
	MIXERS			83,333
	PUMPS			100,000
	PIPING			50,000
	ODOR CONTROL			166,667
	ELECTRICAL			50,000
Operating Costs	Electrical	100	HP	-

BIOSOLIDS DEWATERING				**$2,405,500**
	BUILDING EXPANSION			1,150,000
	ROTARY PRESSES			768,000
	PIPING			275,000
	ELECTRICAL			212,500
Operating Costs	Electrical	200	HP	65,350
	Sludge Trucking	880	Manhours/Year	44,000
	Process Chemicals	1120228.8	Pounds/ Year	84,017

Table 7.8
Estimated Construction and Yearly Operating Expenses For Phase VI Improvements

PLANT EXPANSION SUBTOTAL			$40,524,640
MEMBRANE TREATMENT FACILITY SUBTOTAL			$27,794,640
BUILDING			5,812,000
SITE			812,640
MEMBRANE SYSTEM			18,000,000
PIPING			1,710,000
M,E,P			1,460,000
Operating Costs	Electrical	422 HP	137,904
	Chemicals	4003 lbs/day	116,893
	Membrane Accrual	10 %/yr	360,000
BIOSOLIDS PELLETIZATION FACILITY SUBTOTAL			$12,730,000
BUILDING			2,530,000
SITE			500,000
PELLETIZATION SYSTEM			7,000,000
PIPING			1,500,000
M,E,P			1,200,000
Operating Costs	Electrical	1500 HP	490,122
	Chemicals	10008 lbs/day	292,234

7.2 Engineering Evaluation

Each of the evaluated options are feasible from an engineering standpoint. Capital improvements similar to each of these are being constructed on a daily basis. While the construction of an effluent line to the Cumberland River or J. Percy Priest Reservoir seem daunting based upon the lineal footages of pipeline required, similar projects are being built and commissioned on a regular basis in areas like Florida and California. However, it does not appear that such drastic options are currently required for the City of Murfreesboro.

Construction of advanced treatment wastewater treatment plants is still an emerging technology. The use of membranes for reduction of BOD, TSS and even phosphorous has been documented in numerous pilot plant studies, however there are not many full scale plants utilizing this technology. It is anticipated, however, that the popularity and functionality of this technology will continue to increase over the next several years. Because this technology also provides a total barrier against microbial pathogens, future regulations could require the application of this technology to nonpotable reuse streams.

The indirect, non-potable reuse of wastewater plant effluent is a practice which has gained popularity in recent years. Generally, this water can be applied to commercial or residential property for irrigation purposes, can be utilized as process water for industries producing non-consumable goods, and can be utilized by commercial entities for cooling tower supply water. As the public becomes more informed on the benefits of non-potable reuse, it is anticipated that the demand for this commodity will increase. The only practical consideration required for non-potable systems is that the distribution systems be clearly marked to prevent accidental connection to potable distribution systems.

Land application of non-potable reuse water is also a viable option under this alternative. The MWSD commissioned a study of the soils in the vicinity of

Murfreesboro to determine potential sites for the disposal of effluent through spray irrigation onto dedicated disposal sites. The study indicated that there were numerous tracts of land with appropriate soil and topographic conditions for dedicated disposal. Most of these sites were located in the Northern sector of town in the vicinity of the East Fork of the Stones River. In conjunction with the recommendation to initiate construction of the reuse distribution system, it is advisable for the MWSD to identify and procure properties in these areas which could be utilized for dedicated disposal.

7.3 Environmental Impacts

Construction of any of the proposed treatment system improvements will require extensive excavation in the vicinity of several creeks and the Stones River. This is the area of greatest environmental concern for the alternatives. To prevent pollution of water bodies by eroded soil from the construction site, measures such as silt fencing, temporary settling ponds, and geotextile slope protection will have to be implemented during construction. Other measures may also be implemented including restrictive work hours to mitigate unnecessary noise pollution of the nearby residences and sprinkling or application of calcium chloride to mitigate excessive dust pollution of the project area during construction.

There are no known archaeological sites located at either of the proposed plant sites, or along any of the proposed disposal or reuse pipeline routes. It is expected that any pipeline crossings or site disturbances will require archaeological surveys. Similar experience in the Planning Area suggests that sites of archaeological significance are rare in the areas of proposed improvements.

Interdisciplinary Environmental Review by State and Federal Agencies would be solicited prior to the design of any of the proposed improvements to determine the presence of any listed, protected, or endangered flora or fauna in the vicinity of any construction sites. In any case, protective measures including silt fences and

settling ponds will be implemented to prevent pollution of adjacent streams. These measures will also protect the fish and wildlife population surrounding the project areas.

The evaluated wastewater plants and pipelines are not located along any designated Wild or Scenic Rivers. There are no known wetlands in the vicinity of the projects. It is not anticipated that any special construction activities will be required to protect these entities.

The City of Murfreesboro supplies raw water to its treatment plant from two locations. The first of these is located adjacent to the water treatment plant site on the East Fork of the Stones River. The second intake is located on the Percy Priest Reservoir near the confluence of the East Fork of the Stones River. Neither of these intakes are located in areas where contamination from these projects would be an issue. Additionally, because both the existing Sinking Creek Wastewater Treatment Plant and the evaluated Option 5 treatment facilities discharge into the West Fork of the Stones River, the possibility of contamination of downstream water sources is negligible.

Although there are a number of residences surrounding the project areas, the impact on those residences should be minimal during construction of this project. No displacement of any residences should be necessitated during construction. Tunneling of road crossings will be examined during design to prevent the closure of roadways during construction.

Several crossings of a water bodies will be necessitated during construction of any of the reuse or disposal pipeline projects. The Corps of Engineers, the Tennessee Valley Authority, and the Tennessee Department of Environment and Conservation will be contacted regarding this crossing during the project design phase(s). Some construction will be covered under the COE DA Nationwide Permit #12, and the

TDEC General Permit. Construction of all crossings will include all preventative measures called for under any required permits.

Some of the proposed improvements may be located in the 100-year flood plain. Actual flood plain intrusion will be indicated on finished design documents. All applicable permits and permit requirements will be addressed at that time as part of the contract documents.

7.4 Public Involvement

This planning document will be presented to the Murfreesboro Water & Sewer Board, and then to the Murfreesboro City Council for approval. Upon approval of the document, a public meeting will be scheduled and advertised in the local media. A transcript of that meeting will be attached to this document after that date.

7.5 Implementability

As discussed under the Engineering Evaluation, each of the proposed alternatives offers a feasible solution to the needs of the Murfreesboro wastewater system. Several of the options present obstacles that would require attention by the Murfreesboro Water & Sewer Department.

For instance, the permitting aspects of obtaining an additional NPDES permit for supplemental discharge of treated effluent into either the Cumberland River or the J. Percy Priest Reservoir present a monumental task for the Department. Additionally, it would be difficult to define a route to either of these discharge locations that would be acceptable to the public. Easements along any route through these rural areas also could present difficulties for the Department. In addition to the cost of Alternatives 1 and 2, the implementability issues associated with these options detract from the attractiveness of either option.

Likewise, the issues associated with the construction of a new treatment plant in the southern corridor of the Planning Area would likely present barriers to the Department. With the attractiveness of this area to developers and potential residents, it would be difficult to identify and procure an adequate site for an additional wastewater treatment plant in this area. Furthermore, the expenses associated with finding, hiring, training, and maintaining additional staff for the new treatment plant would substantially increase the cost per gallon of wastewater treatment to the Murfreesboro Water & Sewer Department.

Obtaining sufficient land for spray irrigation and sufficient customers for a viable non-potable reuse system will likely also present challenges for the Department. Similar programs across the country are gaining acceptance, however, and these challenges are not insurmountable. It will require a substantial effort on behalf of the Department to identify and attract customers for this resource. The benefit of this option, however, is that the volume of effluent discharged into the Stones River will not increase as the City grows. As growth occurs additional potential customers will be available, and the distribution system can be expanded accordingly.

8. SELECTED PLAN DESCRIPTION

The decision of which of the proposed alternatives will be implemented has been made based upon all available information. While the simplicity of the concept of discharging the effluent into a larger receiving stream appears attractive on the surface, the associated capital and operating costs quickly discount these options. Likewise, the possibility of constructing a second treatment plant is viable, however public opposition and staffing requirements detract from this option's attractiveness. Advanced treatment at the existing Sinking Creek Wastewater Treatment Plant is not only a viable alternative, but it will likely be required as discharge permits continue to tighten. The Total Maximum Daily Load study will likely dictate the necessity of these processes. It is uncertain whether the addition of these processes could mitigate the need for alternative discharge scenarios, however.

All of these factors together add to the attractiveness of the proposed alternative: Non-potable reuse. Non-potable reuse offers an opportunity for the City to dispose of its superfluous effluent into a system that can be used beneficially by its residents. It offers residents and businesses a necessary commodity at potentially lower prices than they are currently paying. It allows conservation of resources by reducing the amount of water treated at the drinking water plant. Finally, it affords the City of Murfreesboro a method to dispose of its effluent in a stepwise fashion. Only the infrastructure that is needed in a given year must be constructed.

8.1 Relevant Design Parameters

As evidenced through the DMR analysis contained in Section 4, the Sinking Creek Wastewater Treatment Plant is operating exceptionally well. In fact, the plant's current mass loading to the West Fork of the Stones River is so far below the permitted levels that expansion of the plant could likely be implemented without the need for reuse. This alternative is not suggested due to the impending effects of the

TMDL study. The effectiveness of the existing plant does lend justification to an expansion though similar processes, however. The effluent from the Sinking Creek Wastewater Treatment Plant currently meets the established criteria for non-potable reuse. It is recommended that expansion of the plant follow the design scheme of the existing unit processes. Table 8.1 summarizes the assumptions and design criteria for the existing and proposed treatment works.

In addition to construction of parallel facilities to increase the capacity of the Sinking Creek Wastewater Treatment Plant, there are a number of other capital improvements that should be included in the plant expansion. One of these is the construction of a Phosphorous Basin. While not currently regulated under the NPDES, regulatory officials have requested phosphorous sampling of both the plant effluent and the Stones River. It is anticipated that a total phosphorous limit of 1 mg/L will be included in subsequent discharge permits. Recent monitoring of the plant's effluent indicates that levels of 20 mg/L are currently being discharged into the Stones River. Reduction to the anticipated permit level can be achieved through the use of an anaerobic treatment basin upstream of the extended aeration basins. This facility is included in all cost estimates and process layouts in Section 7.

It is also likely that the regulatory agencies will include limitations on nitrates in subsequent NPDES permits. Currently, the SCWWTP effluent must comply with an ammonia limitation and a total nitrogen limitation. The introduction of a nitrate limitation will require denitrification of the plant effluent prior to discharge. The deep bed gravity filters installed in the plant expansion were designed to provide biological denitrification if needed. The only capital expenditure necessary to initiate this treatment modification is the construction of a methanol storage facility. This improvement is also included in the estimates of construction cost for the various alternatives discussed in Section 7.

Discussions with MWSD personnel about the future expansion of the SCWWTP identified several other provisions which should be included into any construction

activities. The most critical of these is the location of the sludge holding facilities. Apparently, the distance from the existing sludge holding tanks to the Biosolids Building presents transfer issues for plant personnel. This design was implemented in order to use existing final clarifiers in lieu of additional construction. It is recommended that as a part of future construction at the plant, that additional sludge holding facilities be constructed in closer proximity to the Biosolids Building to alleviate this problem. This provision is included in the cost of expansion covered in Section 7.

Disposal of wastewater plant effluent into a non-potable reuse system will require numerous capital improvements, as described in Sections 6 and 7. It is recommended that the proposed reuse system be designed as a looped system, and that sizing be based upon an 8 mgd flow rate from the plant. Hydraulic modeling of the proposed system indicates that a 24" looped distribution system should be sufficient for the Planning Period. This system will also require several storage tanks to provide buffering for hydraulic variations and to improve hydraulic flow patterns within the distribution system.

The quality of the effluent from the Sinking Creek Wastewater Treatment Plant currently meets all of the criteria established by the Tennessee Department of Environment and Conservation with the exception of a chlorine residual. Existing regulations require nonpotable water to meet BOD and turbidity levels of less than 10 mg/L and 2 NTU, respectively, for unrestricted urban reuse. Recent regulations complicate and discourage the use of gaseous chlorine to disinfect potable and nonpotable water. It is recommended that the MWSD install a technology such as onsite hypochlorite generation to provide secondary disinfection within the reuse distribution system.

Other guidelines for the design and construction of a nonpotable reuse system include:

1. Provisions must be made to allow the Wastewater Treatment Plant operators to discontinue the pumping of effluent reuse water in the event of an obvious plant upset.
2. The fecal coliform level of the effluent reuse water must not exceed 200 colonies per 100 ml as an instantaneous maximum limit. This shall be measured at the Wastewater Treatment Plant and/or at the storage locations for effluent reuse water. Records of these tests must be maintained at the Wastewater Treatment Plant.
3. Effluent reuse water will be controlled to the extent that run-off as a direct result of over watering is prevented.
4. All effluent reuse water valves or outlets will be appropriately tagged to warn the public that the water is not safe for drinking, bathing, or direct contact.
5. All piping, valves, and outlets will be marked to differentiate effluent reuse water from domestic or other potable water. A different pipe material has been used to facilitate water system identification.
6. All effluent reuse water valves, outlets, and sprinkler heads will be operated only by authorized personnel. Where hose bibbs are present on domestic and effluent reuse water lines, differential sizes will be established to preclude the interchange of hoses.
7. Adequate means of notification will be provided to inform the public that effluent reuse water is being used. Such notification will include the posting of conspicuous warning signs with proper wording of sufficient size so as to be clearly read. At golf courses, notices will also be printed on score cards and at all water hazards containing effluent reuse water.
8. Tank trucks used for carrying or spraying effluent reuse water will be appropriately identified to indicate such.
9. Application or use of effluent reuse water will be done so as to prevent or minimize contact with the public with the sprayed material and precautions shall be taken to ensure that effluent reuse water is not being sprayed on

walkways, passing vehicles, buildings, picnic tables, domestic water facilities, or areas not under control of the user.

a. Application or use of the effluent reuse water should be practiced during periods when the grounds will have maximum opportunity to dry before use by the public unless provisions are made to exclude the public from areas during and after spraying with effluent reuse water.
b. Windblown spray from the application or use of effluent reuse water should not reach areas accessible to the public.
c. Effluent reuse water will be kept completely separate from domestic water wells and reservoirs.
d. Drinking water fountains will be protected from direct or windblown effluent reuse water spray.

10. Adequate measures will be taken to prevent the breeding of flies, mosquitoes, and other vectors of public health significance during the process of effluent reuse.
11. Operation of the effluent reuse water facilities will not create odors, slimes, or unsightly deposits of sewage origin in places accessible to the public.

In addition to nonpotable reuse of the effluent, it is recommended that the MWSD identify and procure land for use as dedicated disposal sites for the effluent. A soil survey of the central Rutherford County area indicated that numerous suitable sites exist in the Northern Sector of town. It is advisable to obtain any of these sites which become available as well as any other sizeable properties within proximity of the reuse distribution system for use as a dedicated disposal site. In general, the soils in Rutherford County are able to support hydraulic loadings of approximately 3 inches per week or 0.29 gallons per day per square foot. This means that a one hundred acre site could support approximately 1 mgd of dedicated effluent disposal on a daily basis. Depending upon the success of locating customers for nonpotable reuse, it may become necessary to acquire sufficient land to apply excess effluent as the flows at the Sinking Creek Wastewater Treatment Plant continue to increase.

8.2 Financial and Managerial Capability

The Murfreesboro Water and Sewer Department maintains a staff of competent professionals that consistently operates and maintains the collection and treatment plant facilities for the City of Murfreesboro. It is not anticipated that additional staffing will be required to implement the chosen alternative. Education of the staff will be required as the reuse system materializes. The proximity of the Fleming Training Center offers the benefit of allowing operators from across the State to come together and educate each other.

The Murfreesboro Water & Sewer Department has historically utilized all available means for the financing of necessary infrastructure additions and repairs. These means have included the use of municipal bonds, loans from the Tennessee Municipal League, loans from the Clean Water State Revolving Loan Program, the use of assessment district fees and the use of reserve funds. Funding for the proposed treatment system improvements will likely utilize the State Revolving Loan Program, however City administrators will make that decision at a later date.

Table 8.1
Existing and Proposed Design Criteria for Treatment Works

Location	Process	Current Avg and Peak Capacities	Proposed Avg and Peak Capacities	Additional Facilities Required
Influent Pump Station	Junction Box	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Additional Junction Box required for proposed interceptors
	Pump System	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Additional Pumps/ Rework Overall Creek Force Main
Headworks	Raw Screens	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Parallel Headworks Facility
	Vortex Grit Basin	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Parallel Headworks Facility
Biological Phosphorous Removal	Phosphorous Basin	Not Currently Available	24 mgd Avg 72 mgd Peak	Construction of New Basin
Secondary Treatment	Oxidation Ditch	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	One Parallel treatment train
	Clarifiers	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	One Parallel treatment train (2 Clarifiers)
	RAS system	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	One Parallel treatment train
Tertiary Treatment	Deep Bed Sand Filtration	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Parallel Filtration Facility
	UV System	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Additional UV equipment
	Post Aeration	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Additional aerators
Residual Managerment	Biosolids Handling	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Parallel Capacity
	Biosolids Dewatering	16 mgd Avg 40 mgd Peak	24 mgd Avg 72 mgd Peak	Additional rotary presses, Possible building expansion

APPENDIX A

2001 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

File 7241004
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STATE OF TENNESSEE

NPDES PERMIT

No. TN0022586

REISSUANCE WITH EXPANDED TREATMENT CAPACITY
Authorization to discharge under the
National Pollutant Discharge Elimination System (NPDES)

Issued By

Tennessee Department of Environment and Conservation
Division of Water Pollution Control
401 Church Street
6th Floor, L & C Annex
Nashville, Tennessee 37243-1534

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Discharger:	**Murfreesboro-Sinking Creek STP**
is authorized to discharge:	**Treated municipal wastewater from Outfall 001**
from a facility located:	**in Murfreesboro, Rutherford County, Tennessee**
to receiving waters named:	**West Fork of the Stones River at mile 10.5**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on:	**October 01, 2001**
This permit shall expire on:	**August 31, 2006**
Issuance date:	**August 31, 2001**

Paul E. Davis, Director
Division of Water Pollution Control

CN-0759

RDAs 2352 and 2366

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PART III

AMENDED RATIONALE AT PERMIT ISSUANCE

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The City of Murfreesboro is authorized to discharge treated municipal wastewater from Outfall 001 to the West Fork of the Stones River at mile 10.5. Discharge 001 consists of municipal wastewater from a treatment facility with a design capacity of 16.0 MGD. Discharge 001 shall be limited and monitored by the permittee as specified below:

Effluent Characteristics	Effluent Limitations						Monitoring Requirements		
	Monthly Average Conc. (mg/l)	Monthly Average Amount (lb/day)	Weekly Average Conc. (mg/l)	Weekly Average Amount (lb/day)	Daily Maximum Conc. (mg/l)	Daily Minimum Percent Removal	Measurement Frequency	Sample Type	Sampling Point
$CBOD_5$ (May 1 - Oct. 31)	5 Report	667	7.5	1001	10 Report	40	7/week 7/week	composite composite	effluent influent
$CBOD_5$ (Nov. 1 - April 30)	10 Report	1334	15	2002	20 Report	40	7/week 7week	composite composite	effluent influent
Ammonia as N (May 1 - Oct. 31)	1	133	1.5	200	2		7/week	composite	effluent
Ammonia as N (Nov. 1 - April 30)	2.2	294	3.3	440	4.4		7/week	composite	effluent
Nitrogen, Total*	9.0	1201					2/month	composite	effluent
Nitrite plus nitrate	Report						2/month	composite	effluent
Kjeldahl Nitrogen, Total	Report						2/month	composite	effluent
Phosphorous, Total	Report						2/month	composite	effluent
Suspended Solids	30 Report	4003	40	5338	45 Report	40	7/week 7/week	composite composite	effluent influent

Note: The permittee shall achieve 85% removal of $CBOD_5$ and TSS on a monthly average basis. The permittee shall report all instances of overflow and/or bypasses. See Part 1.D.5a for reporting requirements.

* No separate test required. Sum of kjeldahl nitrogen (TKN) and nitrite plus nitrate is limited to 9.0 mg/l.

Effluent Characteristics	Effluent Limitations			Monitoring Requirements		
	Monthly Average	Daily Minimum	Daily Maximum	Measurement Frequency	Sample Type	Sampling Point
Fecal Coliform	200/100 ml (see the following paragraphs)		1000/100 ml	7/week	grab	effluent
E. coli	126/100 ml (see the following paragraphs)			7/week	grab	effluent
Dissolved oxygen		6.0 mg/l instantaneous		7/week	grab	effluent
pH (Standard Units)		6.0	9.0	7/week	grab	effluent
Settleable Solids			1.0	1/week	composite	effluent
Flow (MGD)	Report Report		Report Report	7/week 7/week	continuous continuous	influent effluent
IC_{25} (May 1 – Oct. 31)	Survival, reproduction and growth in 99% concentration			1/quarter	composite	effluent
IC_{25} (Nov. 1 – Apr. 30)	Survival, reproduction and growth in 74% concentration			1/quarter	composite	effluent

Note: See Part III (D) for biomonitoring test and reporting requirements. See next page for percent removal calculations.

The wastewater discharge must be disinfected to the extent that viable coliform organisms are effectively eliminated. The concentration of the fecal coliform group after disinfection shall not exceed 200 per 100 ml, nor shall the *E. coli* concentration exceed 126 per 100 ml as the geometric mean based on a minimum of 10 samples, collected from a given sampling site over a period of not more than 30 consecutive days with individual samples being collected at intervals of not less than 12 hours. For the purpose of determining the geometric mean, individual samples having a fecal coliform or *E. coli* group concentration of less than one (1) per 100 ml shall be considered as having a concentration of one (1) per 100 ml. In addition, the concentration of the fecal coliform group in any individual sample shall not exceed 1,000 per 100 ml.

There shall be no distinctly visible floating scum, oil or other matter contained in the wastewater discharge. The wastewater discharge must not cause an objectionable color contrast in the receiving stream.

The wastewater discharge shall not contain pollutants in quantities that will be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream.

Sludge or any other material removed by any treatment works must be disposed of in a manner that prevents its entrance into or pollution of any surface or subsurface waters. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, TCA 68-31-101 et seq. and the Tennessee Hazardous Waste Management Act, TCA 68-46-101 et seq.

For the purpose of evaluating compliance with the permit limits established herein, where certain limits are below the State of Tennessee published required detection levels (RDLs) for any given effluent characteristics, the results of analyses below the RDL shall be reported as Below Detection Level (BDL), unless in specific cases other detection limits are demonstrated to be the best achievable because of the particular nature of the wastewater being analyzed.

For $CBOD_5$ and TSS, the treatment facility shall demonstrate a minimum of 85% removal efficiency on a monthly average basis. This is calculated by determining an average of all daily influent concentrations and comparing this to an average of all daily effluent concentrations. The formula for this calculation is as follows:

$$\left[1 - \frac{\text{average of daily effluent concentration}}{\text{average of daily influent concentration}}\right] \times 100\% = \%\ \text{removal}$$

The treatment facility will also demonstrate 40% minimum removal of the $CBOD_5$ and TSS based upon each daily composite sample. The formula for this calculation is as follows:

$$\left[1 - \frac{\text{daily effluent concentration}}{\text{daily influent concentration}}\right] \times 100\% = \%\ \text{removal}$$

B. MONITORING PROCEDURES

1. Representative Sampling

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements are consistent with accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than plus or minus 10% from the true discharge rates throughout the range of expected discharge volumes.

Samples and measurements taken in compliance with the monitoring requirements specified above shall be representative of the volume and nature of the monitored discharge, and shall be taken at the following location(s):

Influent samples must be collected prior to mixing with any other wastewater being returned to the head of the plant, such as sludge return. Those systems with more than one influent line must collect samples from each and proportion the results by the flow from each line.

Effluent samples must be representative of the wastewater being discharged and collected prior to mixing with any other discharge or the receiving stream. This can be a different point for different parameters, but must be after all treatment for that parameter or all expected change:

a. $CBOD_5$ samples can be collected before chlorination to avoid having to dechlorinate and seed the samples.

b. The chlorine residual must be measured after the chlorine contact chamber and any dechlorination. It may be to the advantage of the permittee to measure at the end of any long outfall lines.

c. Samples for fecal coliform can be collected at any point between disinfection and the actual discharge.

d. The dissolved oxygen can drop in the outfall line; therefore, D.O. measurements are required at the discharge end of outfall lines greater than one mile long. Systems with outfall lines less than one mile may measure dissolved oxygen as the wastewater leaves the treatment facility. For systems with dechlorination, dissolved oxygen must be measured after this step and as close to the end of the outfall line as possible.

e. Total suspended solids and settleable solids can be collected at any point after the final clarifier.

f. Biomonitoring tests (if required) shall be conducted on final effluent.

2. Sampling Frequency

Where the permit requires sampling and monitoring of a particular effluent characteristic(s) at a frequency of less than once per day or daily, the permittee is precluded from marking the "No Discharge" block on the Discharge Monitoring Report if there has been any discharge from that particular outfall during the period which coincides with the required monitoring frequency; i.e. if the required monitoring frequency is once per month or 1/month, the monitoring period is one month, and if the discharge occurs during only one day in that period then the permittee must sample on that day and report the results of analyses accordingly.

3. Test Procedures

a. Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304 (h) of the Clean Water Act (the "Act"), as amended, under which such procedures may be required.

b. Unless otherwise noted in the permit, all pollutant parameters shall be determined according to methods prescribed in Title 40, CFR, Part 136, as amended, promulgated pursuant to Section 304 (h) of the Act.

c. Composite samples must be proportioned by flow at time of sampling. Aliquots may be collected manually or automatically. The sample aliquots must be maintained at 4 degrees Celsius during the compositing period.

d. EPA has proposed to replace existing gravimetric test procedures for the analysis of Oil & Grease with EPA Method 1664 as part of EPA's effort to reduce the dependency on the use of chlorofluorocarbons (CFCs). Method 1664 uses normal hexane as the extraction solvent in place of 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113). CFC-113 is used in currently approved 40 CFR Part 136 methods for the determination of Oil & Grease (EPA Method 413.1; Standard Methods, Method 5520B). In anticipation of this change, the Division will recognize the use of EPA Method 1664 in place of EPA Method 413.1 until such time as its use is required by the final rule published in the Federal Register.

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date and time of sampling;

b. The exact person(s) collecting samples;

c. The dates and times the analyses were performed;

d. The person(s) or laboratory who performed the analyses;

e. The analytical techniques or methods used, and;

f. The results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation shall be retained for a minimum of three (3) years, or longer, if requested by the Division of Water Pollution Control.

C. DEFINITIONS

The "***instantaneous minimum concentration***" is the minimum allowable concentration, in milligrams per liter, of a pollutant parameter contained in the wastewater discharge determined from a grab sample taken from the discharge at any point in time.

The "***instantaneous maximum concentration***" is a limitation on the concentration, in milligrams per liter, of any pollutant contained in the wastewater discharge determined from a grab sample taken on the discharge at any point in time.

The "***daily maximum concentration***" is a limitation on the average concentration in milligrams per liter, of the discharge during any calendar day. When a proportional-to-flow composite sampling device is used, the daily concentration is the concentration of that 24-hour composite; when other sampling means are used, the daily concentration is the arithmetic mean of the concentrations of equal volume samples collected during any calendar day or sampling period.

A "***one week period***" (or "***calendar-week***") is defined as the period from Sunday through Saturday. For reporting purposes, a calendar week that contains a change of month shall be considered part of the latter month.

The "***weekly average concentration***", is the arithmetic mean of all the composite samples collected in a one-week period.

The "***weekly average amount***", shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar week when the measurements were made.

The "***monthly average concentration***", other than for fecal coliform bacteria, is the arithmetic mean of all the composite or grab samples collected in a one-calendar month period.

The "***monthly average amount***", shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

A "***composite sample***" is a combination of not less than 8 influent or effluent portions, of at least 100 ml, collected over a 24-hour period. Under certain circumstances a lesser time period may be allowed, but in no case, less than 8 hours.

A "***grab sample***" is a single influent or effluent sample collected at a particular time.

The "***geometric mean***" of any set of values is the n^{th} root of the product of the individual values where N is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For the purposes of calculating the geometric mean, values of zero (0) shall be considered to be one (1).

A "***calendar day***" is defined as any 24-hour period.

A "***quarter***" is defined as any one of the following three-month periods: January 1 through March 31, April 1 through June 30, July 1 through September 30, and/or October 1 through December 31.

A "***bypass***" is defined as the intentional diversion of waste streams from any portion of a treatment facility.

A ***"dry weather overflow event"*** is defined as one day or any portion of a day in which discharge of wastewater from the collection or treatment system other than through the permitted outfall occurs and is not directly related to a rainfall event. Discharge from more than one point within a 24-hour period shall be counted as separate events.

A "***rainfall event***" is defined as any occurrence of rain, preceded by 10 hours without precipitation that results in an accumulation of 0.01 inches or more. Instances of rainfall occurring within 10 hours of each other will be considered a single rainfall event.

A "***sanitary sewer overflow event***" is defined as an unpermitted discharge of wastewater from the collection or treatment system other than through the permitted outfall that is directly related to a specific rainfall event. Multiple discharge occurrences within a single rainfall event are considered a single sanitary sewer overflow event.

D. REPORTING

1. Monitoring Results

Monitoring results shall be recorded monthly and submitted monthly using Discharge Monitoring Report (DMR) forms supplied by the Division of Water Pollution Control. Submittals shall be postmarked no later than 15 days after the completion of the reporting period. The top two copies of each report are to be submitted. A copy should be retained for the permittee's files. DMRs and any communication regarding compliance with the conditions of this permit must be sent to:

TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
COMPLIANCE REVIEW SECTION
401 CHURCH STREET
L & C ANNEX 6TH FLOOR
NASHVILLE TN 37243-1534

The first DMR is due on the 15th of the month following permit effectiveness.

DMRs must be signed and certified by a responsible corporate officer as defined in 40 CFR 122.22, a general partner or proprietor, or a principal municipal executive officer or ranking elected official, or his duly authorized representative. Such authorization must be submitted in writing and must explain the duties and responsibilities of the authorized representative.

2. Additional Monitoring by Permittee

If the permittee monitors any pollutant specifically limited by this permit more frequently than required at the location(s) designated, using approved analytical methods as specified herein, the results of such monitoring shall be included in the calculation and reporting of the values required in the DMR form. Such increased frequency shall also be indicated on the form.

3. Falsifying Reports

Knowingly making any false statement on any report required by this permit may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Water Pollution Control Act, as amended, and in Section 69-3-115 of the Tennessee Water Quality Control Act.

4. Monthly Report of Operation

Monthly operational reports shall be submitted on standard forms to the appropriate Division of Water Pollution Control Environmental Assistance Center in Jackson, Nashville, Chattanooga, Columbia, Cookeville, Memphis, Johnson City, or Knoxville. Reports shall be submitted by the 15th day of the month following data collection.

5. Bypass and Overflow Reporting

a. Report Requirements

A summary report of known or suspected instances of overflows in the collection system or bypass of wastewater treatment facilities shall accompany the Discharge Monitoring Report. The report must contain the date and duration of the instances of overflow and/or bypassing and the estimated quantity of wastewater discharged and/or bypassed.

The report must also detail activities undertaken during the reporting period to (1) determine if overflow is occurring in the collection system, (2) correct those known or suspected overflow points and (3) prevent future or possible overflows and any resulting bypassing at the treatment facility.

On the DMR, the permittee must report the number of sanitary sewer overflows, dry-weather overflows and in-plant bypasses separately. Three lines must be used on the DMR form, one for sanitary sewer overflows, one for dry-weather overflows and one for in-plant bypasses.

b. Anticipated Bypass Notification

If, because of unavoidable maintenance or construction, the permittee has need to create an in-plant bypass which would cause an effluent violation, the permittee must notify the Division as soon as possible, but in any case, no later than 10 days prior to the date of the bypass.

6. Reporting Less Than Detection

A permit limit may be less than the accepted detection level. If the samples are below the detection level, then report "BDL" or "NODI =B" on the DMRs. The permittee must use the correct detection levels in all analytical testing required in the permit. The required detection levels are listed in the Rules of the Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3-.05(8).

For example, if the limit is 0.02 mg/l with a detection level of 0.05 mg/l and detection is shown; 0.05 mg/l must be reported. In contrast, if nothing is detected reporting "BDL" or "NODI =B" is acceptable.

E. COMPLIANCE WITH SECTION 208

The limits and conditions in this permit shall require compliance with an area-wide waste treatment plan (208 Water Quality Management Plan) where such approved plan is applicable.

F. REOPENER CLAUSE

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 307(a)(2) and 405(d)(2)(D) of the Clean Water Act, as amended, if the effluent standard, limitation or sludge disposal requirement so issued or approved:

1. Contains different conditions or is otherwise more stringent than any condition in the permit; or

2. Controls any pollutant or disposal method not addressed in the permit.

This permit shall also be modified, or alternatively revoked and reissued, to incorporate effluent limitations in accordance with new analytical data obtained and/or total maximum daily load (TMDL) allocations established during the permit term.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

PART II

A. GENERAL PROVISIONS

1. Duty to Reapply

Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of Water Pollution Control (the "Director") no later than 180 days prior to the expiration date.

2. Right of Entry

The permittee shall allow the Director, the Regional Administrator of the U.S. Environmental Protection Agency, or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or where records are required to be kept under the terms and conditions of this permit, and at reasonable times to copy these records;

b. To inspect at reasonable times any monitoring equipment or method or any collection, treatment, pollution management, or discharge facilities required under this permit; and

c. To sample at reasonable times any discharge of pollutants.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Water Pollution Control Act, as amended, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Water Pollution Control. As required by the Federal Act, effluent data shall not be considered confidential.

4. Proper Operation and Maintenance

a. The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory and process controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. Backup continuous pH and flow monitoring equipment are not required.

b. Dilution water shall not be added to comply with effluent requirements to achieve BCT, BPT, BAT and or other technology based effluent limitations such as those in State of Tennessee Rule 1200-4-5-.03.

5. Treatment Facility Failure (Industrial Sources)

The permittee, in order to maintain compliance with this permit, shall control production, all discharges, or both, upon reduction, loss, or failure of the treatment facility, until the facility is restored or an alternative method of treatment is provided. This requirement applies in such situations as the reduction, loss, or failure of the primary source of power.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

7. Severability

The provisions of this permit are severable. If any provision of this permit due to any circumstance, is held invalid, then the application of such provision to other circumstances and to the remainder of this permit shall not be affected thereby.

8. Other Information

If the permittee becomes aware that he failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, then he shall promptly submit such facts or information.

B. CHANGES AFFECTING THE PERMIT

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or

b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants, which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).

2. Permit Modification, Revocation, or Termination

a. This permit may be modified, revoked and reissued, or terminated for cause as described in 40 CFR 122.62 and 122.64, Federal Register, Volume 49, No. 188 (Wednesday, September 26, 1984), as amended.

b. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

c. If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for any toxic pollutant under Section 307(a) of the Federal Water Pollution Control Act, as amended, the Director shall modify or revoke and reissue the permit to conform to the prohibition or to the effluent standard, providing that the effluent standard is more stringent than the limitation in the permit on the toxic pollutant. The permittee shall comply with these effluent standards or prohibitions within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified or revoked and reissued to incorporate the requirement.

3. Change of Ownership

This permit may be transferred to another party (provided there are neither modifications to the facility or its operations, nor any other changes which might affect the permit limits and conditions contained in the permit) by the permittee if:

a. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;

b. The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and liability between them; and

c. The Director, within 30 days, does not notify the current permittee and the new permittee of his intent to modify, revoke or reissue, or terminate the permit and to require that a new application be filed rather than agreeing to the transfer of the permit.

Pursuant to the requirements of 40 CFR 122.61, concerning transfer of ownership, the permittee must provide the following information to the Division in their formal notice of intent to transfer ownership: 1) the NPDES permit number of the subject permit; 2) the effective date of the proposed transfer; 3) the name and address of the transferor; 4) the name and address of the transferee; 5) the names of the responsible parties for both the transferor and transferee; 6) a statement that the transferee assumes responsibility for the subject NPDES permit; 7) a statement that the transferor relinquishes responsibility for the subject NPDES permit; 8) the signatures of the responsible parties for both the transferor and transferee pursuant to the requirements of 40 CFR 122.22(a), "Signatories to permit applications"; and, 9) a statement regarding any proposed modifications to the facility, its operations, or any other changes which might affect the permit limits and conditions contained in the permit.

4. Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

C. NONCOMPLIANCE

1. Effect of Noncompliance

All discharges shall be consistent with the terms and conditions of this permit. Any permit noncompliance constitutes a violation of applicable State and Federal laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

2. Reporting of Noncompliance

a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Pollution Control in the appropriate Environmental Assistance Center within 24-hours from the time the permittee becomes aware of the circumstances. (The Environmental Assistance Center should be contacted for names and phone numbers of environmental response team).

A written submission must be provided within five days of the time the permittee becomes aware of the circumstances unless the Director on a case-by-case basis waives this requirement. The permittee shall provide the Director with the following information:

i. A description of the discharge and cause of noncompliance;

ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and

iii. The steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph 2.a above, the permittee shall report the noncompliance on the Discharge Monitoring Report. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

3. Overflow

a. "***Overflow***" means the discharge of wastes from any portion of the collection, transmission, or treatment system other than through permitted outfalls. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of an overflow. Severe property damage does not mean economic loss caused by delays in production.

b. Both sanitary sewer overflows and dry-weather overflows are prohibited unless all of the following three (3) conditions are met:

i. The overflow is unavoidable to prevent loss of life, personal injury, or severe property damage. Overflows caused by a lack of capacity or improper management, operation, or maintenance do not qualify as meeting this condition;

ii. There are no feasible alternatives to overflow, such as the construction and use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent an overflow which occurred during normal periods of equipment downtime or preventative maintenance;

iii. The permittee submits notice of an unanticipated overflow to the Division of Water Pollution Control in the appropriate environmental assistance center within 24-hours of becoming aware of the overflow (if this information is provided orally, a written submission must be provided within five days). When the need for the overflow is foreseeable, prior notification shall be submitted to the Director, if possible, at least ten (10) days before the date of the overflow.

c. The permittee shall operate the collection system so as to avoid overflows. No new or additional flows shall be added upstream of any point in the collection system, which experiences chronic overflows (greater than 5 events per year) or would otherwise overload any portion of the system. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after: 1) an authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem; 2) the correction work is underway; and 3) the cumulative, peak-design, flows potentially added from new connections and line extensions upstream of any chronic bypass point are less than or proportional to the amount of inflow and infiltration removal documented upstream of that point. The inflow and infiltration reduction must be measured by the permittee using practices that are customary in the flow measurement industry and reported in an attachment to a Monthly Operating Report submitted to the local TDEC Environmental Assistance Center. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.

4. Upset

a. "***Upset***" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence that:

i. An upset occurred and that the permittee can identify the cause(s) of the upset;

ii. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;

iii. The permittee submitted information required under "Reporting of Noncompliance" within 24-hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and

iv. The permittee complied with any remedial measures required under "Adverse Impact."

5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

6. Bypass

a. "***Bypass***" is the intentional diversion of wastewater away from any portion of a treatment facility.

b. Bypasses are prohibited unless all of the following three (3) conditions are met:

i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There are not feasible alternatives to bypass, such as the construction and use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance;

iii. The permittee submits notice of an unanticipated bypass to the Division of Water Pollution Control in the appropriate environmental assistance center within 24-hours of becoming aware of the bypass (if this information is provided orally, a written submission must be provided within five days). When the need for the bypass is foreseeable, prior notification shall be submitted to the Director, if possible, at least ten (10) days before the date of the bypass.

c. Bypasses not exceeding permit limitations are allowed **only** if the bypass is necessary for essential maintenance to assure efficient operation. All other bypasses are prohibited. Allowable bypasses not exceeding limitations are not subject to the reporting requirements of 6.b.iii, above.

7. Washout

a. For domestic wastewater plants only, a "washout" shall be defined as loss of Mixed Liquor Suspended Solids (MLSS) of 30.00% or more. This refers to the MLSS in the aeration basin(s) only. This does not include MLSS decrease due to solids wasting to the sludge disposal system. A washout can be caused by improper operation or from peak flows due to infiltration and inflow.

b. A washout is prohibited. If a washout occurs the permittee must report the incident to the Division of Water Pollution Control in the appropriate Environmental Assistance Center within 24-hours by telephone. A written submission must be provided within five days. The washout must be noted on the discharge monitoring report. Each day of a washout is a separate violation.

D. LIABILITIES

1. Civil and Criminal Liability

Except as provided in permit conditions or "***Bypassing,***" "***Overflow,***" "***Upset,***" "***Diversion,***" and "***Treatment Facility Failures,***" nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of wastewater to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct its wastewater treatment and/or discharge activities in a manner such that public or private nuisances or health hazards will not be created.

2. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or the Federal Water Pollution Control Act, as amended.

PART III

OTHER REQUIREMENTS

A. CERTIFIED OPERATOR

The waste treatment facilities shall be operated under the supervision of a Grade 4 certified wastewater treatment operator and the collection system operated under the supervision of a Grade 2 Collection System certified operator in accordance with the Water Environmental Health Act of 1984.

B. POTW PRETREATMENT PROGRAM GENERAL PROVISIONS

As an update of information previously submitted to the Division, the permittee will undertake the following activity.

1. The permittee has been delegated the primary responsibility and therefore becomes the "control authority" for enforcing the 40 CFR 403 General Pretreatment Regulations. Where multiple plants are concerned the permittee is responsible for the Pretreatment Program for all plants within its jurisdiction. The permittee shall implement and enforce the Industrial Pretreatment Program in accordance with section 403(b)(8) of the Clean Water Act, the Federal Pretreatment Regulations 40 CFR 403, Tennessee Water Quality Control Act Part 63-3-123 through 63-3-128, and the legal authorities, policies, procedures, and financial provisions contained in its approved Pretreatment Program, except to the extent this permit imposed stricter requirements. Such implementation shall require but not limit the permittee to do the following:

   a. Carry out inspection, surveillance, and monitoring procedures which will determine, independent of information supplied by the industrial user (IU), whether the IU is in compliance with the pretreatment standards;

   b. Require development, as necessary, of compliance schedules for each IU for the installation of control technologies to meet applicable pretreatment standards;

   c. Require all industrial users to comply with all applicable monitoring and reporting requirements outlined in the approved pretreatment program and IU permit;

   d. Maintain and update, as necessary, records identifying the nature and character of industrial user discharges, and retain such records for a minimum of three (3) years;

   e. Obtain appropriate remedies for noncompliance by an IU with any pretreatment standard and/or requirement;

f. Publish annually, pursuant to 40 CFR 403.8 (f)(2)(vii), a list of industrial users that have significantly violated pretreatment requirements and standards during the previous twelve-month period.

g. Maintain an adequate revenue structure for continued operation of the pretreatment program.

h. Update its Industrial Waste Survey at least once every five years. Results of this update shall be submitted to the Division of Water Pollution Control, Pretreatment Section within 120 days of the effective date of this permit.

2. The permittee shall enforce 40 CFR 403.5, "prohibited discharges". Pollutants introduced into the POTW by a non-domestic source shall not pass through the POTW or interfere with the operation or performance of the works. These general prohibitions and the specific prohibitions in this section apply to all non-domestic sources introducing pollutants into the POTW whether the source is subject to other National Pretreatment Standards or any State or local Pretreatment Requirements.

Specific prohibitions. Under no circumstances shall the permittee allow introduction of the following wastes in the waste treatment system:

a. Pollutants which create a fire or explosion hazard in the POTW;

b. Pollutants which will cause corrosive structural damage to the treatment works, but in no case discharges with pH less than 5.0 unless the system is specifically designed to accept such discharges.

c. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the treatment system resulting in interference.

d. Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the treatment works.

e. Heat in amounts which will inhibit biological activity in the treatment works resulting in interference, but in no case heat in such quantities that the temperature at the treatment works exceeds 40°C (104°F) unless the works are designed to accommodate such heat.

f. Any priority pollutant in amounts that will contaminate the treatment works sludge.

g. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

h. Pollutants which result in the presence of toxic gases, vapors or fumes within the POTW in a quantity that may cause acute worker health and safety problems;

i. Any trucked or hauled pollutants except at discharge points designated by the POTW.

3. The permittee shall notify the Tennessee Division of Water Pollution Control of any of the following changes in user discharge to the system no later than 30 days prior to change of discharge:

   a. New introductions into such works of pollutants from any source which would be a new source as defined in Section 306 of the Act if such source were discharging pollutants.

   b. New introductions of pollutants into such works from a source which would be subject to Section 301 of the "Federal Water Quality Act as Amended" if it were discharging such pollutants.

   c. A substantial change in volume or character of pollutants being introduced into such works by a source already discharging pollutants into such works at the time the permit is issued.

   This notice will include information on the quantity and quality of the wastewater introduced by the new source into the publicly owned treatment works, and on any anticipated impact on the effluent discharged from such works. If this discharge necessitates a revision of the current NPDES permit or pass-through guidelines, discharge by this source is prohibited until the Tennessee Division of Water Pollution Control gives final authorization.

4. Reporting Requirements

   The permittee shall provide a semiannual report briefly describing the permittee's pretreatment program activities over the previous six-month period. Reporting periods shall end on the last day of the months of March and September. The report shall be submitted to the Division of Water Pollution Control, Central Office and a copy to the appropriate Environmental Assistance Center no later than the 28th day of the month following each reporting period. For control authorities with multiple STPs, one report should be submitted with a separate Form 1 for each STP. Each report shall conform to the format set forth in the State POTW Pretreatment Semiannual Report Package which contains information regarding:

   a. An updated listing of the permittee's industrial users.

   b. Results of sampling of the influent and effluent of the wastewater treatment plant. At least once each reporting period, the permittee shall analyze the wastewater treatment plant influent and effluent for the following pollutants, using the prescribed sampling procedures:

Pollutant	Sample Type
chromium	24-hour composite
copper	24-hour composite
lead	24-hour composite
nickel	24-hour composite
zinc	24-hour composite
cadmium	24-hour composite
mercury	24-hour composite
total phenols	grab
cyanide	*grab*

If any particular pollutant is analyzed more frequently than is required, the permittee shall report the maximum and average values on the semiannual report. All upsets, interferences, and pass-through violations must also be reported on the semiannual report, the actions that were taken to determine the causes of the incidents and the steps that have been taken to prevent the incidents from recurring.

At least once during the term of this permit, the permittee shall analyze the effluent from the STP (and report the results in the next regularly scheduled report) for the following pollutants:

chromium, total	silver	phthalates, sum of the following:
copper	benzene	bis (2-ethylhexyl) phthalate
lead	carbon tetrachloride	butyl benzylphthalate
nickel	chloroform	di-n-butylphthalate
zinc	ethylbenzene	diethyl phthalate
cadmium	methylene chloride	tetrachloroethylene
mercury	naphthalene	toluene
phenols, total	1,1,1 trichloroethane	trichloroethylene
cyanide	1,2 trans-dichloroethylene	

c. Compliance with categorical and local standards, and review of industrial compliance, which includes a summary of the compliance status for all permitted industries. Also included is information on the number and type of major violations of pretreatment regulations, and the actions taken by the POTW to obtain compliance. The effluent from all significant industrial users must be analyzed for the appropriate pollutants at least once per reporting period.

d. A list of industries in significant non-compliance as published in local newspapers in accordance with the requirements set forth in 40 CFR 403.8(f)(2)(vii).

e. A description of all substantive changes made to the permittee's pretreatment program. Any such changes shall receive prior approval. Substantive changes include, but are not limited to, any change in any ordinance, major modification in the program's administrative structure, local limits, or a change in the method of funding the program.

f. Summary of permittee's industrial user inspections, which includes information on the number and type of industry inspected. All significant industrial users must be inspected at least once per year.

C. SLUDGE MANAGEMENT PRACTICES

1. The permittee must sample and analyze the sludge at a frequency that is dependent upon the amount of sludge generated annually, in conformance with 40 CFR 503 et seq. Unless an exemption from 40 CFR 503 applies for the specific disposal method employed, the permittee shall report to the Division the quantitative data for the following parameters:

1)	Arsenic	7)	Nickel
2)	Cadmium	8)	Selenium
3)	Copper	9)	Zinc
4)	Lead	10)	Nitrite plus Nitrate, NO_2, + NO_3 as N
5)	Mercury	11)	Total Kjeldahl Nitrogen, as N
6)	Molybdenum	12)	Ammonia, NH_3, as N

This sludge analysis must be submitted by February 19th of each calendar year. This information shall be submitted to the Division of Water Pollution Control, Central Office, 401 Church Street, 6th Floor Annex, Nashville TN 37243-1534, Attention: Sludge Coordinator, Municipal Facilities Section.

2. Land application of sludge is prohibited if any of the following concentrations are exceeded:

POLLUTANT	CONCENTRATION (mg/kg[1])
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57

POLLUTANT	CONCENTRATION (mg/kg[1])
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7500

1 Dry Weight Basis

3. If land application is the final disposition of the wasted sludge, the permittee shall provide pathogen reduction, sludge stabilization and comply with land and crop usage controls as listed in 40 CFR Part 503, as authorized by the Clean Water Act. Records must be maintained by the permittee that indicates compliance or non-compliance with this rule. If the permittee is required to report to EPA, copies of all reports should be sent to the Division, at the address listed in paragraph 1 of this section.

4. Before land applying municipal sludge the permittee must obtain approvals for each site(s) in writing from the Division, unless the sludge being land applied meets the pollutant concentrations of 40 CFR 503.13(b)(3), the Class A pathogen requirements in 40 CFR 503.32(a), and one of the vector attraction reduction requirements in 40 CFR 503.33 (b)(1) through (b)(8).

5. Reopener: If an applicable "acceptable management practice" or numerical limitation for pollutants in sewage sludge promulgated under Section 405(d)(2) of the Clean Water Act, as amended by the Water Quality Act of 1987, is more stringent than the sludge pollutant limit or acceptable management practice in this permit, or controls a pollutant not limited in this permit, this permit shall be promptly modified or revoked and reissued to conform to the requirements promulgated under Section 405(d)(2). The permittee shall comply with the limitations by no later than the compliance deadline specified in the applicable regulations as required by Section 405(d)(2) of the Clean Water Act.

6. Notice of change in sludge disposal practice: The permittee shall give prior notice to the Director of any change planned in the permittee's sludge disposal practice.

D. BIOMONITORING REQUIREMENTS, CHRONIC

The permittee shall conduct a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test and a 7-Day Fathead Minnow *(Pimephales promelas)* Larval Survival and Growth Test on samples of final effluent from Outfall 001.

The measured endpoint for toxicity will be the inhibition concentration causing 25% reduction in survival, reproduction and growth (IC_{25}) of the test organisms. The IC_{25} shall be determined based on a 25% reduction as compared to the controls, and as derived from linear interpolation. The average reproduction and growth responses will be determined based on the number of *Ceriodaphnia dubia* or *Pimephales promelas* larvae used to initiate the test.

Summer: (May 1 – October 31)

Test shall be conducted and its results reported based on appropriate replicates of a total of five serial dilutions and a control, using the percent effluent dilutions as presented in the following table:

Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
100% Effluent	Permit Limit (PL)	0.50 X PL	0.25 X PL	0.125 X PL	Control
% effluent					
100	99	49.5	24.75	12.375	0

Winter: (Nov. 1 – Apr. 30)

Test shall be conducted and its results reported based on appropriate replicates of a total of five serial dilutions and a control, using the percent effluent dilutions as presented in the following table:

Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
100% Effluent	(100+PL)/2	Permit Limit (PL)	0.50 X PL	0.25 X PL	Control
% effluent					
100	87	74	37	18.5	0

The dilution/control water used will be moderately hard water as described in EPA/600/4-91/002 (or the most current edition). A chronic standard reference toxicant quality assurance test shall be conducted with each species used in the toxicity tests and the results submitted with the discharge monitoring report.

Toxicity will be demonstrated if the IC_{25} is less than or equal to the permit limit indicated for each outfall in the above table(s). Toxicity demonstrated by the tests specified herein constitutes a violation of this permit.

All tests will be conducted using a minimum of three 24-hour flow-proportionate composite samples of final effluent collected on days 1, 3 and 5. If, in any control more than 20% of the test organisms die in 7 days, the test (control and effluent) is considered invalid and the test shall be repeated within two (2) weeks. Furthermore, if the results do not meet the acceptability criteria of section 4.9.1, EPA/600/4-91/002 (or the most current edition), that test shall be repeated. Any test initiated but terminated before completion must also be reported along with a complete explanation for the termination.

The toxicity tests specified herein shall be conducted quarterly (1/Quarter) for Outfall 001 and begin no later than 90 days from the effective date of this permit.

In the event of a test failure, the permittee must start a follow-up test within 2 weeks and submit results from a follow-up test within 30 days from obtaining initial WET testing results. The follow-up test must be conducted using the same serial dilutions as presented in the corresponding table(s) above. **The follow-up test will not negate an initial failed test. In addition, the failure of a follow-up test will constitute a separate permit violation.**

In the event of 2 consecutive test failures or 3 test failures within a 12-month period for the same outfall, the permittee must initiate a Toxicity Identification Evaluation/Toxicity Reduction Evaluation (TIE/TRE) study within 30 days and so notify the Division by letter. This notification shall include a schedule of activities for the initial investigation of that outfall. **During the term of the TIE/TRE study, the frequency of biomonitoring shall be once every three months.** Additionally, the permittee shall submit progress reports once every three months throughout the term of the TIE/TRE study. The toxicity must be reduced to allowable limits for that outfall within 2 years of initiation of the TIE/TRE study. Subsequent to the results obtained from the TIE/TRE studies, the permittee may request an extension of the TIE/TRE study period if necessary to conduct further analyses. The final determination of any extension period will be made at the discretion of the Division.

The TIE/TRE study may be terminated at any time upon the completion and submission of 2 consecutive tests (for the same outfall) demonstrating compliance. Following the completion of TIE/TRE study, the frequency of monitoring will return to a regular schedule, as defined previously in this section as well in Part I of the permit. **During the course of the TIE/TRE study, the permittee will continue to conduct toxicity testing of the outfall being investigated at the frequency of once every three months but will not be required to perform follow-up tests for that outfall during the period of TIE/TRE study.**

Test procedures, quality assurance practices, determinations of effluent survival/reproduction and survival/growth values, and report formats will be made in accordance with Short-term Methods For Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-91/002 or the most current edition.

Results of all tests, reference toxicant information, copies of raw data sheets, statistical analysis and chemical analyses shall be compiled in a report. The report will be written in accordance with Short-term Methods For Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-91/002 or the most current edition.

Two copies of biomonitoring reports (including follow-up reports) shall be submitted to the Division. One copy of the report shall be submitted along with the discharge monitoring report (DMR). The second copy shall be submitted to the local Division of Water Pollution Control office address (see table below):

Division of Water Pollution Control			
Office	**Location**	**Zip Code**	**Phone No.**
Chattanooga	540 McCallie Avenue, Suite 550	37402-2013	(423) 634-5745
Jackson	362 Carriage House Drive	38305-2222	(901) 512-1300
Cookeville	1221 South Willow Avenue	38506	(931) 432-4015
Columbia	2484 Park Plus Drive	38401	(931) 380-3371
Johnson City	2305 Silverdale Road	37601	(423) 854-5400
Knoxville	2700 Middlebrook Pike, Suite 220	37921	(865) 594-6035
Memphis	2510 Mt. Moriah Road, Suite E-645	38115-1511	(901) 368-7939
Nashville	711 R.S. Gass Boulevard	37243-1550	(615) 687-7000

E. PLACEMENT OF SIGNS

Within sixty (60) days of the effective date of this permit, the permittee shall place and maintain a sign(s) at each outfall and any bypass/overflow point in the collection system. For the purposes of this requirement, any bypass/overflow point that has discharged five (5) or more times in the last year must be so posted. The sign(s) should be clearly visible to the public from the bank and the receiving stream. The minimum sign size should be two feet by two feet (2' x 2') with one-inch (1") letters. The sign should be made of durable material and have a white background with black letters.

The sign(s) are to provide notice to the public as to the nature of the discharge and, in the case of the permitted outfalls, that the discharge is regulated by the Tennessee Department of Environment and Conservation, Division of Water Pollution Control. The following is given as an example of the minimal amount of information that must be included on the sign:

Permitted CSO or unpermitted bypass/overflow point:

UNTREATED WASTEWATER DISCHARGE POINT
Murfreesboro-Sinking Creek STP
(615) 848-3225
NPDES Permit NO. TN0022586
TENNESSEE DIVISION OF WATER POLLUTION CONTROL
1-888-891-8332 WPC ENVIRONMENTAL ASSISTANCE CENTER

NPDES Permitted Municipal/Sanitary Outfall:

TREATED MUNICIPAL/SANITARY WASTEWATER
Murfreesboro-Sinking Creek STP
(615) 848-3225
NPDES Permit NO. TN0022586
TENNESSEE DIVISION OF WATER POLLUTION CONTROL
1-888-891-8332 WPC ENVIRONMENTAL ASSISTANCE CENTER

No later than sixty (60) days from the effective date of this permit, the permittee shall have the above sign(s) on display in the location specified.

F. ANTIDEGRADATION

Pursuant to the Rules of the Tennessee Department of Environment and Conservation, Chapter 1200-4-3-.06, titled "Tennessee Antidegradation Statement," and in consideration of the Department's directive in attaining the greatest degree of effluent reduction achievable in municipal, industrial, and other wastes, the permittee shall further be required, pursuant to the terms and conditions of this permit, to comply with the effluent limitations and schedules of compliance required to implement applicable water quality standards, to comply with a State Water Quality Plan or other State or Federal laws or regulations, or where practicable, to comply with a standard permitting no discharge of pollutants.

G. STREAM SURVEY

As a continuation of the previous permit, the permittee must perform stream monitoring which includes:

A. Chemical

1. Type of sample - grab

2. Locations
   a) upstream of Blanton Road
   b) downstream at Shacklett Road

3. Analysis/Frequency
   a) Dissolved oxygen shall be sampled once per week between the hours of 6:00 a.m. - 8:00 a.m.
   b) Carbonaceous biochemical oxygen demand and nutrient series (ammonia, kjeldahl nitrogen, nitrate plus nitrite, total phosphorous, phosphorous as orthophosphate) shall be sampled once per two weeks.
   c) Samples shall be collected during the months of May through October, only.
   d) Other conditions to be recorded at the same time as instantaneous D.O. grab samples will be: time of day, temperature, conductivity and pH.

4. One sample shall be collected at each location, mid-channel, mid-depth.

B. Biological

1. Frequency – Annually, during the period March through May, when river "stress" is due to pollutant loading rather than due to seasonal temperatures and low flow.

2. The survey shall be conducted by qualified biologists. The permittee shall notify the EAC - Nashville, Division of Water Pollution Control, at least two weeks prior to conducting the biological survey.

3. Locations
   a) upstream of Blanton Road
   b) upstream in the riffle habitat in the vicinity of river mile 32.3 (at Rock Springs Road)

c) downstream at Shacklett Road

The sites selected must provide appropriate habitat and must be generally comparable. No site shall be in an area where modification has taken place (i.e., dams, bridges). Prior to sampling, all selected stream sampling points shall be marked on a topographical map, submitted to and approved by the EAC - Nashville, Division of Water Pollution Control.

4. The biosurvey will integrate habitat assessment with macroinvertebrate assessment. The survey will be conducted in accordance with protocols issued by the Division as adapted from EPA's Rapid Bioassessment Protocols For Use in Streams and Rivers EPA/444/4-89/001.

5. The following information shall be recorded at each station during the biosurvey:
   a) water temperature (°C)
   b) dissolved oxygen (mg/l)
   c) pH (S.U.)
   d) conductivity (umhos)
   e) stream flow (cfs)

Results of the chemical and biological stream sampling shall be submitted to the EAC - Nashville, Division of Water Pollution Control along with the Monthly Operation Report.

AMENDED RATIONALE AT PERMIT ISSUANCE

This rationale amends the rationale of 01/18/01, attached to the draft permit public noticed 01/25/01, as well as the rationale of 06/18/01, attached to the revised draft permit public noticed 16/18/01.

Murfreesboro-Sinking Creek STP

NPDES PERMIT No. TN0022586

August 31, 2001

Permit Writer: Wade Murphy

I. DISCHARGER

NAME: Murfreesboro-Sinking Creek STP
REPRESENTATIVE: Joseph Kirchner
LOCATION: Murfreesboro, Rutherford County, Tennessee
PHONE NUMBER: (615) 848-3225
WATERSHED: Stones HUC: 5130203
WASTEWATER: Treated municipal wastewater from Outfall 001
Discharge number: 001
Average design flow: 16.0 MGD
Industrial flow: Approximately 10% of average design flow

II. E. COLI

Revisions of October 1999, to the Tennessee General Water Quality Criteria, Rule 1200-4-3-.03(4)(f), require that all waters designated for recreational use meet an *E. coli* coliform standard in addition to the fecal coliform standard. The Division began adding this new requirement to all NPDES permits since previous public notices of the draft permit.

III. REOPENER CLAUSE

The reopener clause in Part I.F. has been modified to allow reopening of the permit during the permit term to incorporate effluent limits as necessary to comply with the total maximum daily load (TMDL) being developed to remedy the organic enrichment of the West Fork Stones River and its resulting effect on instream dissolved oxygen. Additionally, the reopener is broad enough to allow modification of the nutrient effluent limitations and monitoring in this permit based on new analytical data even prior to conclusion of the TMDL if, for example, data demonstrates the limitations are insufficient to prevent further impairment by enrichment as the discharge expands to the design flow of 16.0 MGD.

IV. PHOSPHOROUS

The previous fact sheets have not specifically explained why limiting of phosphorous is not necessary other than to say that nitrogen is typically the limiting nutrient downstream of wastewater treatment facilities. While that remains the essential reason at this point, the following data serve to develop the rationale.

Ambient nitrogen and phosphorous data collected by the Division upstream of the STP at river miles 13.6 and 23.2 suggest that phosphorous is the limiting nutrient upstream of the STP. As shown in the table below, the nitrogen to phosphorous ratio is significantly greater than 10:1 in all but one (1) case of sampling conducted in January, February, April, July and October 2000, and June 2001, at both sites. In numerous instances, testing did not even detect phosphorous down to a level of 0.004 mg/l.

STATION	DATE	TIME	NO2&3	TOT PHOS
WFSTO013.6	000127	1200	1.62	U0.004
WFSTO023.2	000202	1313	1.91	U0.004
WFSTO023.2	000410	1118	0.81	0.02
WFSTO013.6	000419	1300	0.65	0.02
WFSTO023.3	000724	0938	0.98	U0.004
WFSTO013.6	000726	1213	0.14	0.018
WFSTO023.2	001016	0926	1.11	0.013
WFSTO013.6	001018	1250	0.13	U0.004
WFSTO013.6	010601	0950	0.49	U0.004
WFSTO023.2	010601	1225	0.63	U0.004

U0.00X = not detected down to 0.00X mg/l concentration

However, this data is not conclusive. Statistics on data for the eco-region suggests that eco-region itself may be nitrogen-limited. Stream data for Eco-region #71i shows the mean nitrate-nitrite and phosphorous concentrations to be 0.492 and 0.166 respectively and projects the 90th percentile concentrations to be 0.922 and 0.185 respectively. These ratios of less than 10:1 indicate nitrogen is the limiting nutrient in the eco-region. Utilization of the phosphorous and the resulting phosphorous-limited condition in the river at Miles 13.6 and 23.2 suggests a non-point source of nitrogen upstream of the STP.

Of greater importance to the permit is the fact that the STP effluent would have been nitrogen limited from the previous 8.0 MGD facility since phosphorous is plentiful in municipal wastewater effluent. According to the text, Wastewater Engineering, Treatment/Disposal/Reuse, Second Edition, Metcalf & Eddy, Inc., McGraw-Hill Book Company, phosphorous in medium strength wastewater would approximate 8 mg/l and its removal by the biological process is a function of the solids removal. As estimated in the fact sheet dated June 18, 2001, pollutant removals by the previous facility were the minimum secondary level at best, so little phosphorous removal would have occurred in the treatment process. The estimated ratio of nitrogen to phosphorous in the effluent would have been roughly 2:1 (18 mg/N vs. 8 mg/l P). This ratio is altered only slightly by the ambient nitrogen in the above table since the stream is effluent dominated at low flow conditions. Current STP flow is greater than 8.0 MGD as compared to critical low stream flow in summer of 0.2 MGD.

Because the stream is effluent dominated, limiting the nitrogen versus phosphorous is projected to keep the nitrogen to phosphorous ratio less than 10:1 and postpones engineering of any phosphorous removal process until the TMDL establishes the waste load allocation on which to base the design.

AMENDED RATIONALE

This rationale amends the rationale of 01/18/01 attached to the draft permit public noticed 01/25/01. It covers revisions to the draft permit public noticed in June 2001.

Murfreesboro-Sinking Creek STP

NPDES PERMIT No. TN0022586

June 18, 2001

Permit Writer: Wade Murphy

I. DISCHARGER

NAME: Murfreesboro-Sinking Creek STP
REPRESENTATIVE: Joseph Kirchner
LOCATION: Murfreesboro, Rutherford County, Tennessee
PHONE NUMBER: (615) 848-3225
WATERSHED: Stones HUC: 5130203
WASTEWATER: Treated municipal wastewater from Outfall 001
Discharge number: 001
Average design flow: 16.0 MGD
Industrial flow: Approximately 10% of average design flow

II. DENITRIFICATION AS TREATMENT PROCESS

Sections I and V.C. of the rationale (fact sheet) dated January 18, 2001 state that the new Sinking Creek STP has a denitrification process. The Division acknowledges that denitrification is included in the design of this 16.0 MGD extended aeration activated sludge treatment facility to improve the settleability of the sludge and to reduce oxygen demand requirements (from the oxygen recovery in the denitrification process) rather than for removal of nitrate/nitrite from the effluent. Still, effluent limitations must uphold water quality standards irregardless of what treatment processes may, or may not, have been included in the design. More specifically, the effluent limitations prevent this expanded discharge capacity from contributing to an increase in the stream impairment which already exists due to organic enrichment and low dissolved oxygen.

III. NITROGEN LIMIT

The previous fact sheet indicated that an effluent limitation of 5.0 mg/l would ensure a nutrient contribution toward organic enrichment which is less than or equal to the amount contributed from the 8.0 MGD treatment facility. The limit of 5.0 mg/l is considered a technology-based limit applicable to facilities employing the denitrification process. Reconsideration of the past STP performance allows for some relaxation of this limit.

According to Phosphorous and Nitrogen Removal from Municipal Wastewater Principles and Practice, Second Edition, Richard Sedlak, Editor, Lewis Publishers, 1991, conventional biological wastewater treatment removes only a small fraction of nitrogen due to its being a necessary ingredient in the biomass that is formed and subsequently settled out in the clarifiers. The reference states the theoretical maximum ratio of nitrogen removed to BOD removed is only 0.075. Influent nitrogen into the previous 8.0 MGD facility is not specifically known. However, numerous textbooks quote 25 and 30 mg/l as typical nitrogen concentrations in raw wastewater. The text referenced in the paragraph says that municipal sewage can contain nitrogen with concentrations between 85 and 20 mg/l depending on whether the sewage is "strong" or "weak".

In the worse case, this facility receives "weak" influent due to infiltration and inflow. Additionally, the previous facility should have achieved an average monthly BOD reduction of 85%. Therefore, nitrogen removal could have expected to approximate 6% (0.075 X 85%). Assuming a 20 mg/l influent concentration is reduced by only 6%, the effluent concentration would have been 18 mg/l from the 8.0 MGD facility. This equates to an effluent limitation of 9.0 mg/l for a 16.0 MGD facility.

IV. TIER DESIGNATION FOR WEST FORK STONES RIVER

State field staff evaluated the reach of the West Fork Stones River that includes Mile 10.5 in January 2001 and designated it a Tier I stream based on scenic, ecological, specialized recreation, and water quality considerations.

V. SEASONAL $CBOD_5$ LIMIT FOR WINTER

As stated in the previous fact sheet, no increase in biochemical oxygen demand is allowed from an expanded discharge when a receiving stream is impaired with low dissolved oxygen levels. In the previous permit draft, the simple remedy was to keep the $CBOD_5$ loading the same and to halve the effluent concentration from 10 to 5 mg/l. However, that remedy does not take into account that the doubled discharge flow will double the mass of oxygen also discharged to the stream. According to Streeter-Phelps modeling, the oxygen in the expanded effluent actually improves the projected dissolved oxygen in stream.

At assumed, worse-case, winter conditions, the modeling showed that a dissolved oxygen sag bottomed out at 4.989 mg/l at Mile 8.3 with the previous 8.0 MGD effluent limitations of 10 mg/l CBOD5, 5.0 mg/l ammonia, and 6.0 mg/l D.O. With the added 6.0 mg/l of D.O. in the expansion to16.0 MGD, the sag bottoms out at 5.207 mg/l at Mile 8.0. This means that the model projects overall recovery to take a slightly greater distance and an improvement to the ambient dissolved oxygen levels. Therefore, the previous winter concentration of 10 mg/l and the added mass loading associated with the 16.0 MGD flow is allowable.

Modeling results for both the winter and summer $CBOD_5$ limitations can be viewed in the administrative file record for NPDES #TN0022586 located in the Central Office of the Division of Water Pollution Control, Nashville, Tennessee.

VI. LOCATION OF AMMONIA TOXICITY CALCULATIONS

Likewise, the ammonia toxicity calculations can be also viewed in the administrative file record for NPDES #TN0022586 located in the Central Office of the Division of Water Pollution Control, Nashville, Tennessee.

VII. SETTLEABLE SOLIDS LIMITATION

The previous draft permit failed to include a limitation for settleable solids. Its omission was in error. State Rule 1200-4-5-.03 requires that municipal wastewater treatment plants achieve a settleable solid limit of 1.0 mg/l, so the parameter must be monitored and reported. At the request of Murfreesboro, the measurement frequency is being reduced from 7 per week to 1 per week. Seven per week is the standard monitoring frequency required of facilities with design flows greater than 10 MGD. However, because this facility will utilize tertiary filtration following the extended aeration process, measurement of effluent settleable solids four times per month is sufficient to document compliance with the settleable solids standard.

VIII. RESIDUAL CHLORINE LIMITATION

An effluent limitation for residual chlorine is not necessary in the discharge permit of this expanded facility since chlorine will not be utilized for disinfection.

IX. METALS AND TOXICS

As stated in the fact sheet of January 18, 2001, pass-through limitations for heavy metals and other toxic substances were recalculated in the fall of 1999 as part of local pretreatment program changes made in association with this 16.0 MGD facility.

The following mass balance formula is used to evaluate water quality protection:

$$Cw \leq \frac{(S_A)\,[Cm\,(Qs + Qw) - QsCs]}{Qw}$$

where:

Cw = allowable concentration of pollutant in wastewater
Cs = stream background concentration
Qw = design flow of the STP
Qs = stream low flow
Cm = allowable in-stream concentration after mixing
(water quality criteria divided by fraction dissolved)
S_A = percent "stream allocation"

1. The critical low flow values are determined using USGS data:

Fish and Aquatic Life Protection
3Q20 - Low flow under natural conditions (prior to October 1999)
1Q20 - Regulated flow conditions (prior to October 1999)
7Q10 - Low flow under natural conditions (effective October 1999)
1Q10 - Regulated low flow conditions (effective October 1999)

Other than Fish and Aquatic Life Protection
30Q2 - Low flow under natural conditions

2. Fish & Aquatic Life water quality criteria for certain metals are developed through application of hardness dependent equations. These criteria are combined with dissolved fraction methodologies in order to formulate the final effluent concentrations.

3. For criteria that are hardness dependent, chronic and acute concentrations are based on a hardness of 50 mg/L and total suspended solids (TSS) of 10 mg/L unless STORET or water supply intake data substantiate a different value. Minimum and maximum limits on the hardness value used for water quality calculations are 25 mg/L and 400 mg/L respectively.

4. Background concentrations are determined from the Division data base, results of sampling obtained from the permittee, and/or obtained from nearby stream sampling data. If this background data is not sufficient, one-half of the chronic "In-stream Allowable" water quality criteria for fish and aquatic life is used. If the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, then the measured background concentration is replaced with the chronic "In-stream Allowable" water quality criteria for the purpose of calculating the appropriate effluent limitation (Cw). Under these circumstances, and in the event the "stream allocation" is less than 100%, the calculated chronic effluent limitation for fish and aquatic life should be equal to the chronic "In-stream Allowable" water quality criteria. These guidelines should be strictly followed where the industrial source water is not the receiving stream. Where the industrial source water is the receiving stream, and the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, consideration may be given as to the degree to which the permittee should be required to meet the requirements of the water quality criteria in view of the nature and characteristics of the receiving stream.

In some cases an "effluent limited" value is imposed. This upper level of allowable pollutant loading is established if (a) the calculated water quality value is greater than accepted removal efficiency values, (b) the treatment facility is properly operated, and (c) full compliance with the pretreatment program is demonstrated. This upper level limit is based upon EPA's 40 POTW Survey on levels of metals that should be discharged from a POTW with a properly enforced pretreatment program and considering normal coincidental removals.

The comparison of the calculated limits with semi-annual report data indicated that the potential exists for the effluent to exceed the water quality criteria for cyanide. Therefore, the permit was originally drafted with an effluent limitation for cyanide.

However, Murfreesboro has submitted data showing that monthly cyanide has either measured less than the allowable limit during the four years from January 1997 through December 2000 or that the questionable effluent concentrations have been greater than influent concentrations. Sulfide interference is suspected as causing this false appearance that cyanide is being generated in the activated sludge process. The interference argument is also supported by the fact that Murfreesboro has not had an industrial cyanide contributor in more than 10 years. Therefore, the previously proposed limitation for cyanide is now eliminated from the permit.

X. STREAM SURVEY

In response to field staff comment, Part III.G. of the permit specifies chemical and sampling locations in terms of fixed geographical features on the river (bridges) rather than in terms of river miles. "Upstream of the STP discharge" has been revised to read, "Upstream of Blanton Road." Because the West Fork of the Stones River has its own eco-region reference site upstream of the STP, the location, "eco region reference site approved by Division biologists", has been revised to read, "Upstream in the riffle habitat in the vicinity of mile 32.3 at Rock Springs Road". With regards to the downstream sampling site, "downstream of the STP discharge in the area of river mile 7.8-8.4" has been revised to read, "downstream at Shacklett Road".

In response to the comment by the Division's Planning and Standards Section, the time frame for the biological testing has been narrowed to March to May in order for the test results to reflect impacts due to pollution rather than from the normal stresses associated with hot, dry months of June through November.

XI. REFERENCE TO 40 CFR 503

Even though the permittee anticipates disposing of its wastewater treatment plant sludge in a municipal solid waste landfill for the duration of this permit, reference to 40 CFR 503 will remain in the permit since the conditions for exemption from the monitoring and reporting requirements are themselves contained in 40 CFR 503. Retaining the remainder of the standard sludge language serves to remind the permittee of the responsibilities associated with the option of land application of sludge.

RATIONALE

Murfreesboro-Sinking Creek STP

NPDES PERMIT No. TN0022586

01/18/2001

Permit Writer: Wade Murphy

I. DISCHARGER

NAME: Murfreesboro-Sinking Creek STP
REPRESENTATIVE: Joseph Kirchner
LOCATION: Murfreesboro, Rutherford County, Tennessee
PHONE NUMBER: (615) 848-3225
WATERSHED: Stones HUC: 5130203
WASTEWATER: Treated municipal wastewater from Outfall 001
Discharge number: 001
Average design flow: 16.0 MGD
Industrial flow: Approximately 10% of average design flow
PRESENT TREATMENT: Oxidation ditch process with nitrification and denitrification preceded by rotary drum screening and grit basins and followed by tertiary filtration, ultraviolet disinfection and post aeration. Sludge is dewatered inside rotary sludge presses for subsequent landfill disposal. STP is designed to provide effluent suitable for irrigation and other non-potable uses as an alternative to stream discharge.
STATUS: Reissuance with expanded treatment capacity

II. RECEIVING WATERS

STREAM: West Fork of the Stones River at mile 10.5
LOW FLOW: 7Q10 (summer) = 0.2 MGD (0.3 CFS)
7Q10 (winter) = 5.7 MGD (8.9 CFS)
ESTABLISHED FROM: Regression equations; USGS Water-Resources Investigation Reports 86-4007 (winter) and 85-4191 (summer). USGS Water-Resources Investigation Report 95-4293 Station #03428200 data affected by WWTP effluent so not used.
CLASSIFICATION: Industrial water supply, fish and aquatic life, recreation, irrigation, livestock watering and wildlife.
WATER QUALITY STATUS: The West Fork of the Stones River at mile 10.5 is considered partially supportive of its designated use classifications due to organic enrichment/low dissolved oxygen from development impacts around Old Fort Parkway and STP impacts per the 305(b) Report of September 1998.
TIER DESIGNATION: Not evaluated at this time.

III. PREVIOUS PERMIT

Issued: **08/31/1993**
Expires: **08/30/1998**

PARAMETERS	MONTHLY AVERAGE CONCENTRATION (MG/L)	MAXIMUM CONCENTRATION (MG/L)
$CBOD_5$	10	
NH_3-N (May 1- Oct. 31)	2	
NH_3-N (Nov. 1- April 30)	5	
Total Suspended Solids	30	
Dissolved Oxygen	6.0 (daily minimum)	
Total Chlorine Residual		0.02 (daily maximum)
Fecal Coliform (colonies/100ml)	200	1000
Settleable Solids (ml/l)		1.0 (daily maximum)
pH (standard units)	6.0-9.0 -	
Flow (MGD):		
Influent	Report	Report
Effluent	Report	Report
Whole Effluent Toxicity:		
96 hour LC_{50}	100% per sample	
NOEC	85% per sample	
Metals & Toxics:		
Chromium, T	0.054	
Copper, T	Report	
Cyanide, T	0.006	
Lead, T	0.011	
Zinc, T	Report	

IV. DISCHARGE MONITORING REPORT (DMR) REVIEW

The new STP initiated operation during the later part of January 2000, so an analysis of DMR data through January 2000 is irrelevant to the new facility. Review of the Discharge Monitoring Reports beginning in February 2000 shows that, after an initial "start-up" period of several months, the facility achieved the following effluent characteristics between May and November 2000 (excluding October whose DMR was not readily available for review):

Parameter	Range (mg/l)	Avg. (mg/l)
Dissolved Oxygen:	6.6-7.0	6.8
pH	6.3-8.0 (standard units)	
$CBOD_5$ (mon. avg.)	1-2	2
$CBOD_5$ (daily max.)	2-4	3
NH_3-N (mon. avg.)	0.1	0.1
NH_3-N (daily max.)	0.1	0.1
TSS (mon. avg.)	1-3	2
TSS (daily max.)	3-33	12.5
$CBOD_5$ % Removal		99% (monthly)
TSS % Removal		99% (monthly)

V. PROPOSED EFFLUENT LIMITS & RATIONALE

PARAMETERS	MONTHLY AVERAGE CONCENTRATION, (MG/L)	RATIONALE
$CBOD_5$	5	Impaired stream permitting strategy Refer to A below
NH_3-N (May 1- Oct. 31)	1	Impaired stream permitting strategy Refer to A below
NH_3-N (Nov. 1- April 30)	2.2	Ammonia toxicity, Refer to B below
Total Suspended Solids	30	T.C.A. 1200-4-5-.03
Dissolved Oxygen	6.0 (daily minimum)	D.O. protection, Refer to A below
Total Chlorine Residual	none	U.V. disinfection
Nitrogen, Total	5.0	Impaired stream permitting strategy Refer to C below
Nitrite plus nitrate	Report	Refer to C below
Kjeldahl Nitrogen, Total	Report	Refer to C below
Phosphorous, Total	Report	Refer to C below
Fecal Coliform (colonies/100ml)	200	T.C.A. 1200-4-3-.03
Settleable Solids (ml/l)	1.0 (daily maximum)	T.C.A. 1200-4-5-.03
pH (standard units)	6.0-9.0	T.C.A. 1200-4-3-.03
Flow (MGD):		
Influent	Report	Used to quantify pollutant load
Effluent	Report	Used to quantify pollutant load
Whole Effluent Toxicity:		
IC_{25} (May 1 – Oct. 31)	99% per sample	Refer to D below
IC_{25} (Nov. 1 – Apr. 30)	74% per sample	Refer to D below
Metals & Toxics:		
Cyanide	0.0049	Refer to E below

A. $CBOD_5$, Ammonia, and D.O.

Because oxygen in the West Fork Stones River is impaired from organic enrichment, no increase in biochemical oxygen demand or ammonia is allowed from an expanded discharge. Because the treatment capacity is doubling, discharge concentrations in the previous permit are halved to keep mass effluent limitations unchanged.

Streeter-Phelps modeling was performed at various conditions to consider allowable organic loadings. For consideration only, planning limits were issued in 1993 for discharging when stream flow to STP flow ratios were 3:1 and 5:1. At those theoretical ratios and higher proposed effluent limitations, dissolved oxygen concentrations of 7.0 mg/l or more were required in the effluent to result in an instream dissolved oxygen concentration that remains above the required minimum of 5.0 mg/l. However, modeling shows that at the discharge conditions proposed in this permit, an effluent concentration of 6.0 mg/l is sufficient to maintain the minimum instream oxygen level.

B. AMMONIA AS N

The State utilizes the EPA document, Ambient Water Quality Criteria for Ammonia – December 1999 and site-specific or assumed temperature and pH stream information to derive an allowable instream protection value. A mass balance with plant and stream flows then determines the monthly average permit limit. Reducing the ammonia limit of the previous permit by half to keep the mass load on the impaired stream unchanged results in an ammonia limit sufficient to avoid ammonia toxicity at summer conditions. However, the winter limit has to be reduced slightly below half of the previous winter ammonia limit in order to prevent toxicity at worse case winter flow conditions.

C. 303(d) LIST CONCERNS

The West Fork of the Stones River at mile 10.5 is partially supportive of its designated use classifications due to organic enrichment/ low dissolved oxygen per the 303(d) List of September 1998. Nutrients from the STP may be contributing to the organic enrichment of the receiving stream. Nitrogen is the limiting nutrient in most stream segments downstream from any STPs. Algae need nitrogen and phosphorous for growth and will continue to grow until one is exhausted. Since phosphorous is readily available due to agriculture and urban runoff, nitrogen is almost immediately utilized by the algae. Phosphorous will remain unusable until nitrogen is replenished. Algal growth will proceed at a rate that is controlled by the rate that nitrogen is produced. Therefore, total phosphorous is *monitored* and total nitrogen is *limited* to minimize the nutrient available for the growth of algae.

The effluent limit of 5.0 mg/l is based on proven de-nitrification treatment technology. The mass load from this expanded STP with de-nitrification technology, discharging a total nitrogen concentration of 5.0 mg/l or less, is less than the theoretical mass of total nitrogen from an 8.0 MGD STP without de-nitrification. Influent total nitrogen normally ranges from 20 to 40 mg/l and approximately half of that is expected to be discharged in the effluent after partial assimilation by the biomass.

The effluent *monitoring* for various forms of nitrogen and phosphorous is designed to characterize the discharge of nutrients into the West Fork of the Stones River at mile 10.5. According to the 1998 305(b) Report, "a Total Maximum Daily Load (TMDL) is a study that quantifies the amount of a pollutant in a stream, identifies the sources of the pollutant, and recommends regulatory or other actions that may need to be taken in order to clean up the stream". Since municipal wastewater is a source of nutrients, results from the STP effluent characteristics in conjunction with non point source loadings (agriculture, urban runoff, storm sewers, and land development) will be analyzed in TMDLs. Composite sampling will be twice per month for the life of this permit.

D. BIOMONITORING

The Division evaluates all dischargers for reasonable potential to exceed the narrative water quality criterion, "no toxics in toxic amounts". The Division has determined that for POTWs with stream dilutions of less than 500 to 1, any of the following conditions demonstrates reasonable potential to exceed this criterion.

1. Toxicity is suspected or demonstrated.
2. A pretreatment program is required.
3. The design capacity of the facility is greater than 1.0 MGD.

Because the receiving stream affords little dilution of the STP effluent at worse case flow conditions, the worse case flow condition allows aquatic life within the stream a long term, or chronic, exposure to the effluent. In previous permitting strategy, the Division used the NOEC as the measure of chronic toxicity and coupled it with the requirement to estimate the 96-hour LC_{50} (acute toxicity) from the NOEC. However, LC_{50}s cannot be accurately calculated from the NOEC since the test requirements are different. Alternately, the IC_{25} test for chronic toxicity is deemed equal to but statistically preferred to the NOEC because the IC_{25} is not readily affected by variability in the test data and it incorporates both mortality and chronic effects. Therefore, the IC_{25} chronic test is only required. Seasonal limits are allowed for the seasonal flow variation.

CHRONIC TOXICITY

Summer: (May 1 - October 31)

$$IC_{25}\ \% = \frac{\text{Design Flow}}{\text{Low Flow + Design Flow}} * 100 \geq \frac{16.0}{0.2 + 16.0} * 100 \geq 99\%$$

Winter: (November 1 - April 30)

$$IC_{25}\ \% = \frac{\text{Design Flow}}{\text{Low Flow + Design Flow}} * 100 \geq \frac{16.0}{5.7 + 16.0} * 100 \geq 74\%$$

where:

0.2	=	Low Flow - 7Q10 (MGD), summer
5.7	=	Low Flow - 7Q10 (MGD), winter
16.0	=	Design Flow Capacity (MGD)
IC_{25}	=	Concentration causing 25% reduction in survival, reproduction and growth of test organisms

E. METALS AND TOXICS

Pass-through limitations for heavy metals and other toxic substances were recalculated in the fall of 1999 as part of local pretreatment program changes made in association with this 16.0 MGD facility. That recalculation uses the 3Q20 versus the 7Q10 flow. Because both the 3Q20 and 7Q10 are small relative to the proposed discharge flow, pass through numbers based on the 7Q10 are within a probable margin of error associated with the 3Q20 flow. Therefore, local limits and water quality effluent limitations for metals will be based on the 3Q20 for this reissuance of the permit.

This POTW is required to implement/maintain a pretreatment program. More frequent monitoring will be required **in the permit** if (a) the reported concentrations approach or exceed calculated allowable values, (b) significant amounts of particular pollutants are present which may impact the treatment process sludge character or the receiving stream, or (c) minimum information is lacking to accurately calculate water quality protection values, in which case additional stream monitoring may also be required.

For those parameters with an annual monitoring frequency: The annual monitoring frequency will remain throughout the term of this permit. If monitoring for a particular pollutant indicates that the pollutant is not present (i.e., consistently below detection level), then the Division may drop the monitoring requirements in the reissued permit.

The following procedure is used to calculate the allowable instream concentrations for pass-through guidelines and permit limitations.

1. The most recent background conditions of the receiving stream segment are compiled. This information includes:

    * 3Q20 of receiving stream (1.35 MGD, USGS)
    * Calcium hardness (187 mg/l, ambient monitoring data)
    * Total suspended solids (22 mg/l, ambient monitoring data)
    * Background metals concentrations (½ water quality; ambient monitoring data)
    * Other dischargers impacting this segment (none)
    * Downstream water supplies, if applicable

2. The chronic water quality criteria is converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, lead, nickel and zinc. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions.

3. The acute water quality criteria is converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, lead, nickel, zinc, silver and mercury. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions for the following metals: cadmium, copper, lead, nickel, silver and mercury.

4. The chronic criteria for Chromium (T) is given in the total recoverable form and is not converted to a dissolved lab condition or to the total recoverable ambient condition.

5. A standard mass balance equation determines the total allowable concentration (permit limit) for each pollutant. This equation also includes a percent stream allocation of no more than 90%.

In some cases an "effluent limited" value is imposed. This upper level of allowable pollutant loading is established if (a) the calculated water quality value is greater than accepted removal efficiency values, (b) the treatment facility is properly operated, and (c) full compliance with the pretreatment program is demonstrated. This upper level limit is based upon EPA's 40 POTW Survey on levels of metals that should be discharged from a POTW with a properly enforced pretreatment program and considering normal coincidental removals.

A summary of the semi-annual reports as well as discharge monitoring report data indicates that the potential exists for the water quality criteria for cyanide to be exceeded. Therefore, a water-quality based effluent limitation for cyanide is included as an effluent limitation in this permit.

VI. OTHER REQUIREMENTS & CONDITIONS

A. GRADE 4 CERTIFIED WASTEWATER TREATMENT OPERATOR

B. GRADE 2 COLLECTION SYSTEM CERTIFIED OPERATOR

C. PRETREATMENT PROGRAM

The Murfreesboro-Sinking Creek STP has an approved pretreatment program. An updated Industrial Waste Survey must be completed within 120 days of permit reissuance.

At least once each reporting period, all permittees with approved pretreatment programs are required to analyze the STP influent and effluent for the following pollutant parameters: chromium, copper, lead, nickel, zinc, cadmium, mercury, total phenols, and cyanide. These pollutants were selected because, historically, they are the ones that tend to be predominant in industrial wastewaters. Other pollutants may be added to the list, as required.

During preparation of this permit, data from previous semiannual reports, as well as data from previous Toxics Release Inventory (TRI) lists, were analyzed. If any particular value of a pollutant equals or exceeds 85% of the pass-through limit, or if the TRI list indicates what may be a significant amount of other pollutants being discharged to the sewer system, the pollutant was added to the list of those that are required to be sampled. Based on our review of the semiannual reports and other documents, sampling for additional pollutants is not required at this time.

D. MINIMUM PERCENT REMOVALS

The treatment facility is required to remove 85% of the $CBOD_5$ and TSS that enter the facility on a monthly basis. This is part of the minimum requirement for all municipal treatment facilities contained in Code of Federal Regulations 40 Part 133.102. The reasons stated by the U.S.E.P.A. for these requirements are to achieve these two basic objectives:

(1) To encourage municipalities to correct excessive inflow and infiltration (I/I) problems in their sanitary sewer systems, and

(2) To help prevent intentional dilution of the influent wastewater as a means of meeting permit limits.

The treatment facility is required to remove 40% of the $CBOD_5$ and TSS that enter the facility on a daily basis. This percent removal will be calculated three times per week and recorded on the Monthly Operation Report. The number of excursions less than 40% will be reported on the Discharge Monitoring Report.

E. STREAM SURVEY

In addition to nutrient monitoring of the STP effluent, receiving stream data is necessary to calibrate the computer model to be used in establishing a Total Maximum Daily Load of oxygen demanding pollutants from both the Sinking Creek STP point source and nonpoint sources to the West Fork of the Stones River. While EPA and/or the State of TN will collect stream data characterizing numerous reaches of the river, this permit will require the permittee to characterize the reach of the river most directly affected by the discharge. Sampling will continue through the term of this permit from May 1, through October 31, of each year with results submitted to the EAC-Nashville with the Monthly Operation Report.

F. PERMIT TERM

This permit is being reissued for 5 years in order to coordinate its reissuance with other permits located within the Stones Watershed.

VII. COMPLIANCE SCHEDULE SUMMARY

Section		Description
I.	D 1	Discharge Monitoring Reports, monthly
I.	D 4	Operational reports, monthly
I.	D 5	Bypass and Overflow Summary Report, monthly
III.	B	Industrial Waste Survey, within 120 days of the effective permit date
III.	C	Sludge analysis must be submitted by February 19th of each calendar year
III.	D	Biomonitoring Report, quarterly beginning within 90 days of the effective permit date
III.	G	Chemical and biological survey of river, May 1 – October 31, of each year

f. Publish annually, pursuant to 40 CFR 403.8 (f)(2)(vii), a list of industrial users that have significantly violated pretreatment requirements and standards during the previous twelve-month period.

g. Maintain an adequate revenue structure for continued operation of the pretreatment program.

h. Update its Industrial Waste Survey at least once every five years. Results of this update shall be submitted to the Division of Water Pollution Control, Pretreatment Section within 120 days of the effective date of this permit.

2. The permittee shall enforce 40 CFR 403.5, "prohibited discharges". Pollutants introduced into the POTW by a non-domestic source shall not pass through the POTW or interfere with the operation or performance of the works. These general prohibitions and the specific prohibitions in this section apply to all non-domestic sources introducing pollutants into the POTW whether the source is subject to other National Pretreatment Standards or any State or local Pretreatment Requirements.

Specific prohibitions. Under no circumstances shall the permittee allow introduction of the following wastes in the waste treatment system:

a. Pollutants which create a fire or explosion hazard in the POTW;

b. Pollutants which will cause corrosive structural damage to the treatment works, but in no case discharges with pH less than 5.0 unless the system is specifically designed to accept such discharges.

c. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the treatment system resulting in interference.

d. Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the treatment works.

e. Heat in amounts which will inhibit biological activity in the treatment works resulting in interference, but in no case heat in such quantities that the temperature at the treatment works exceeds 40°C (104°F) unless the works are designed to accommodate such heat.

f. Any priority pollutant in amounts that will contaminate the treatment works sludge.

g. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

h. Pollutants which result in the presence of toxic gases, vapors or fumes within the POTW in a quantity that may cause acute worker health and safety problems;

APPENDIX B

DISCHARGE MONITORING REPORTS (DMRs)
1994-2001

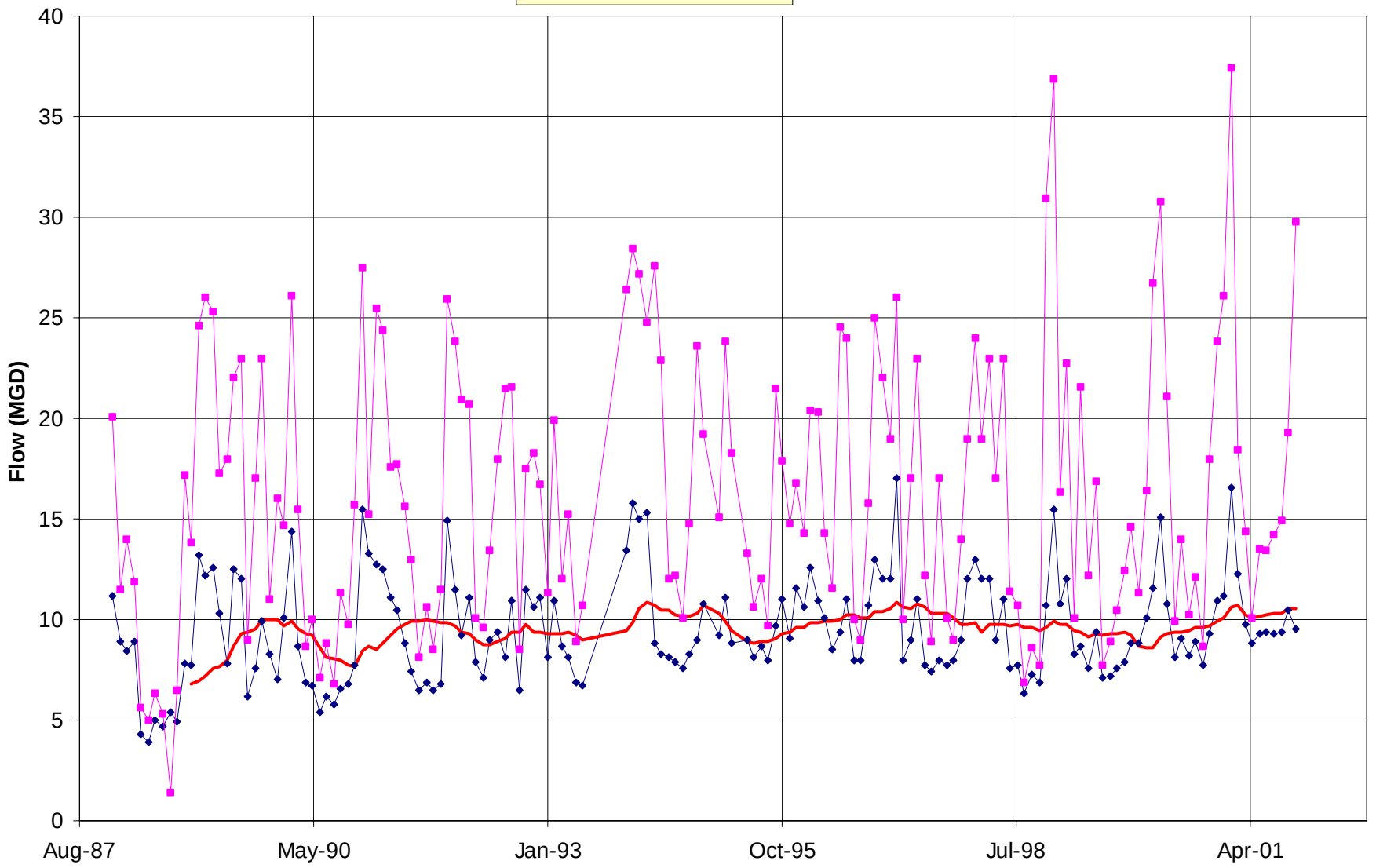
(Includes selected data from 1987-1993)

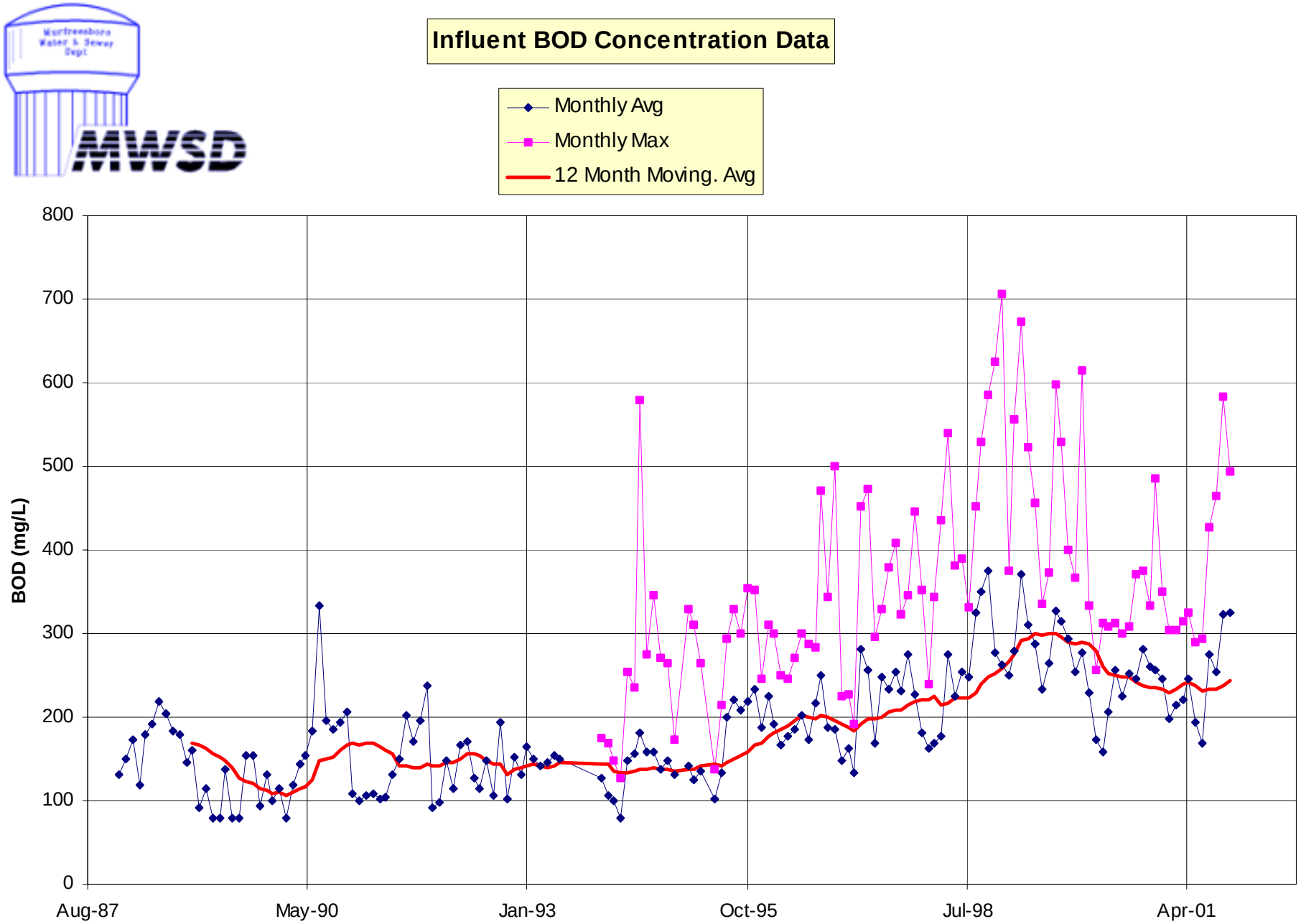
MURFREESBORO WATER & SEWER DEPARTMENT
PLANT PERFORMANCE 1999-2001
1/7/02

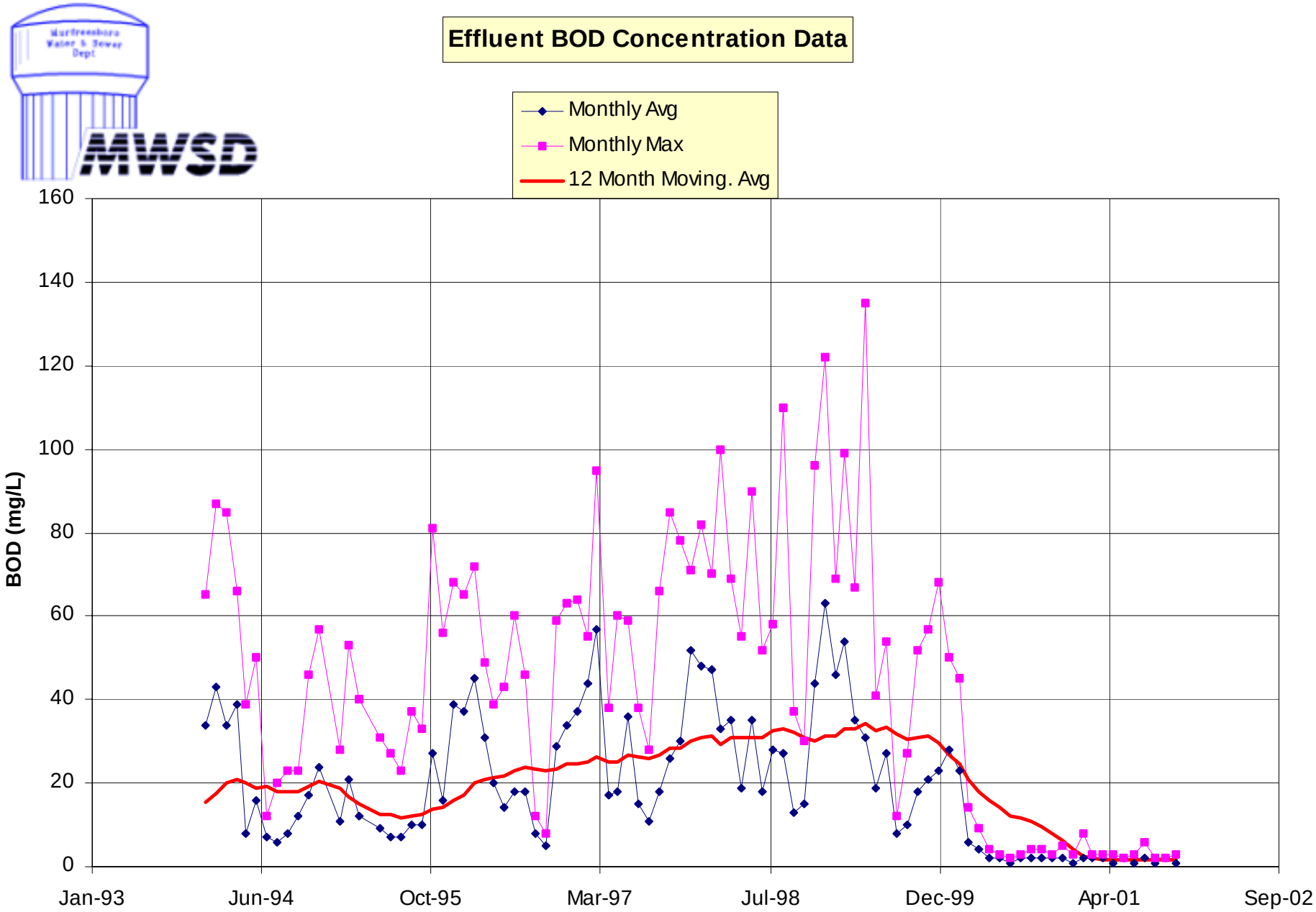
DATE	EFFLUENT BOD (mg/L)	% OF PERMIT	EFFLUENT BOD (lbs/d)	% OF PERMIT	EFFLUENT TSS (mg/L)	% OF PERMIT	EFFLUENT TSS (lbs/d)	% OF PERMIT	EFFLUENT NH4 (mg/L)	% OF PERMIT	EFFLUENT NH4 (lbs/d)	% OF PERMIT
Jan-99	63	630	8123	609	63	210	8123	203	8	382	1083	368
Feb-99	46	460	4143	311	49	163	4414	110	10	455	901	306
Mar-99	54	540	5404	405	51	170	5104	128	8	364	801	272
Apr-99	35	350	2423	182	40	133	2769	69	12	545	831	283
May-99	31	620	2249	337	45	150	3265	82	17	1700	1233	927
Jun-99	19	380	1204	181	36	120	2282	57	19	1900	1204	905
Jul-99	27	540	2117	317	35	117	2744	69	8	800	627	472
Aug-99	8	160	474	71	24	80	1421	36	3	320	189	142
Sep-99	10	200	600	90	23	77	1381	35	3	250	150	113
Oct-99	18	360	1141	171	35	117	2218	55	11	1090	691	519
Nov-99	21	210	1384	104	29	97	1911	48	13	609	883	300
Dec-99	23	230	1688	127	31	103	2275	57	9	418	675	230
Jan-00	28	280	2055	154	32	107	2349	59	9	391	631	215
Feb-00	23	230	1937	145	14	47	1179	29	16	709	1314	447
Mar-00	6	**60**	580	**44**	6	**20**	580	**15**	14	**645**	1374	**467**
Apr-00	4	**40**	504	**38**	6	**20**	756	**19**	11	**500**	1385	**471**
May-00	2	**40**	180	**27**	1	**3**	90	**2**	2	**240**	216	**163**
Jun-00	2	**40**	135	**20**	2	**7**	135	**3**	0	**10**	7	**5**
Jul-00	1	**20**	76	**11**	2	**7**	152	**4**	0	**10**	8	**6**
Aug-00	2	**40**	137	**21**	3	**10**	205	**5**	0	**10**	7	**5**
Sep-00	2	**40**	148	**22**	1	**3**	74	**2**	0	**10**	7	**6**
Oct-00	2	**40**	128	**19**	1	**3**	64	**2**	0	**10**	6	**5**
Nov-00	2	**20**	155	**12**	3	**10**	233	**6**	0	**5**	8	**3**
Dec-00	2	**20**	182	**14**	1	**3**	91	**2**	1	**27**	55	**19**
Jan-01	1	**10**	93	**7**	1	**3**	93	**2**	1	**23**	47	**16**
Feb-01	2	**20**	277	**21**	1	**3**	138	**3**	0	**9**	28	**9**
Mar-01	2	**20**	205	**15**	2	**7**	205	**5**	0	**9**	21	**7**
Apr-01	2	**20**	163	**12**	1	**3**	82	**2**	0	**5**	8	**3**
May-01	1	**20**	73	**11**	1	**3**	73	**2**	0	**10**	7	**6**
Jun-01	2	**40**	155	**23**	1	**3**	78	**2**	0	**10**	8	**6**
Jul-01	1	**20**	78	**12**	1	**3**	78	**2**	0	**10**	8	**6**
Aug-01	2	**40**	155	**23**	1	**2**	47	**1**	0	**10**	8	**6**
Sep-01	1	**20**	78	**12**	1	**3**	78	**2**	0	**20**	16	**12**
Oct-01	2	**40**	175	**26**	1	**4**	96	**2**	0	**10**	9	**7**
Nov-01	1	**10**	79	**6**	1	**4**	103	**3**	0	**5**	8	**3**
1/99-12/99												
AVG	30	**390**	2579	**242**	38	**128**	3159	**79**	**10**	**736**	**772**	**403**
MAX	63	**630**	8123	**609**	63	**210**	8123	**203**	**19**	**1900**	**1233**	**927**
MIN	8	**160**	474	**71**	23	**77**	1381	**35**	**3**	**250**	**150**	**113**
2/00-11/01**												
AVG	2	**30**	179	**19**	2	**6**	164	**4**	**0**	**11**	**15**	**7**
MAX	6	**60**	580	**44**	6	**20**	756	**19**	**1**	**27**	**55**	**19**
MIN	1	**10**	73	**6**	1	**2**	47	**1**	**0**	**5**	**6**	**3**

** The period of 1/01 through 2/01 is excluded from the Average/ Max/ Min calculations. The values are not representative due to the amount of time it took for

Figure 4.1
Monthly Flow Data




Influent BOD Concentration Data
Monthly Avg
Monthly Max
12 Month Moving. Avg
BOD (mg/L)
800
700
600
500
400
300
200
100
0
Aug-87
May-90
Jan-93
Oct-95
Jul-98
Apr-01


Effluent BOD Concentration Data
Monthly Avg
Monthly Max
12 Month Moving. Avg
BOD (mg/L)
160
140
120
100
80
60
40
20
0
Jan-93
Jun-94
Oct-95
Mar-97
Jul-98
Dec-99
Apr-01
Sep-02

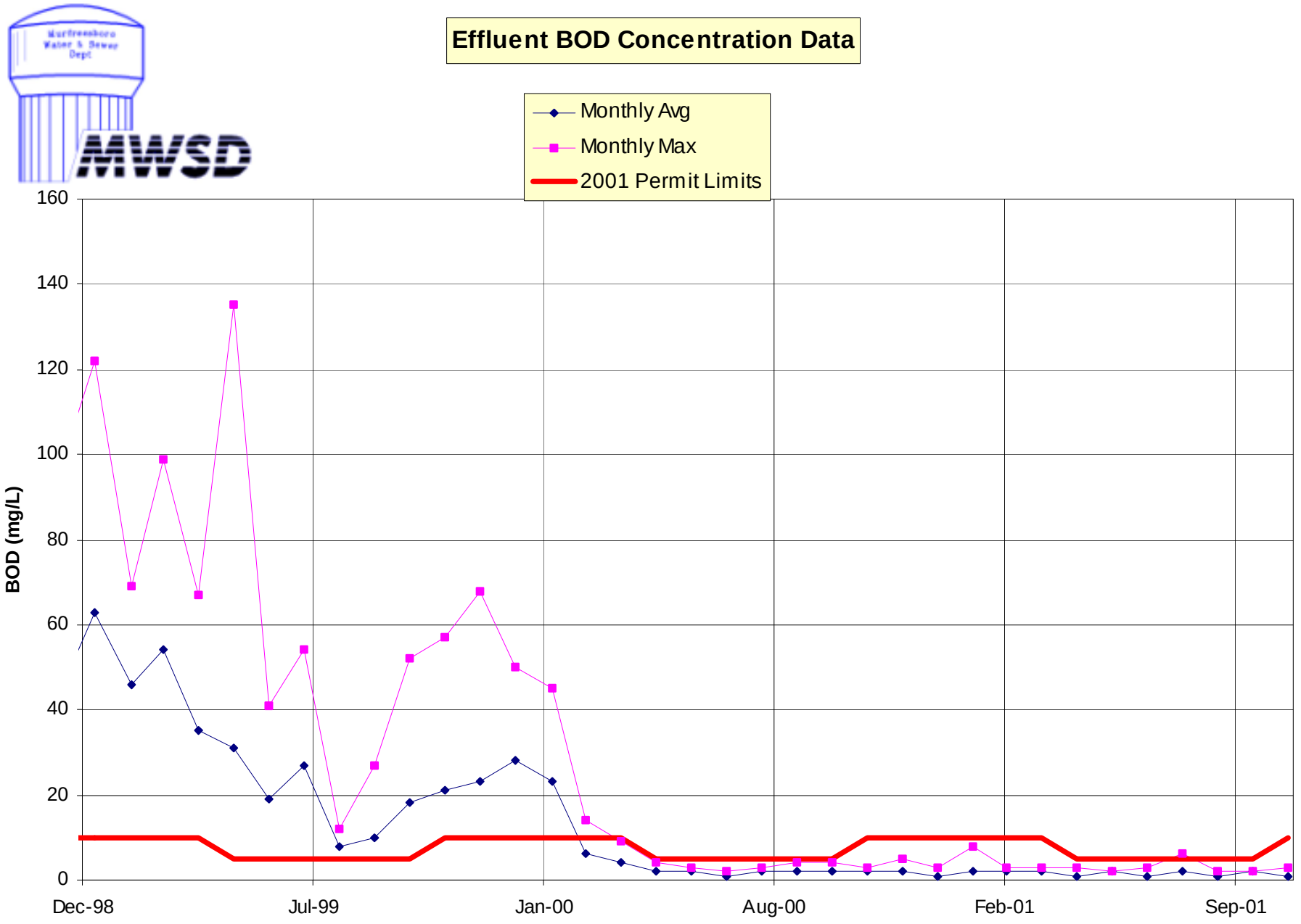
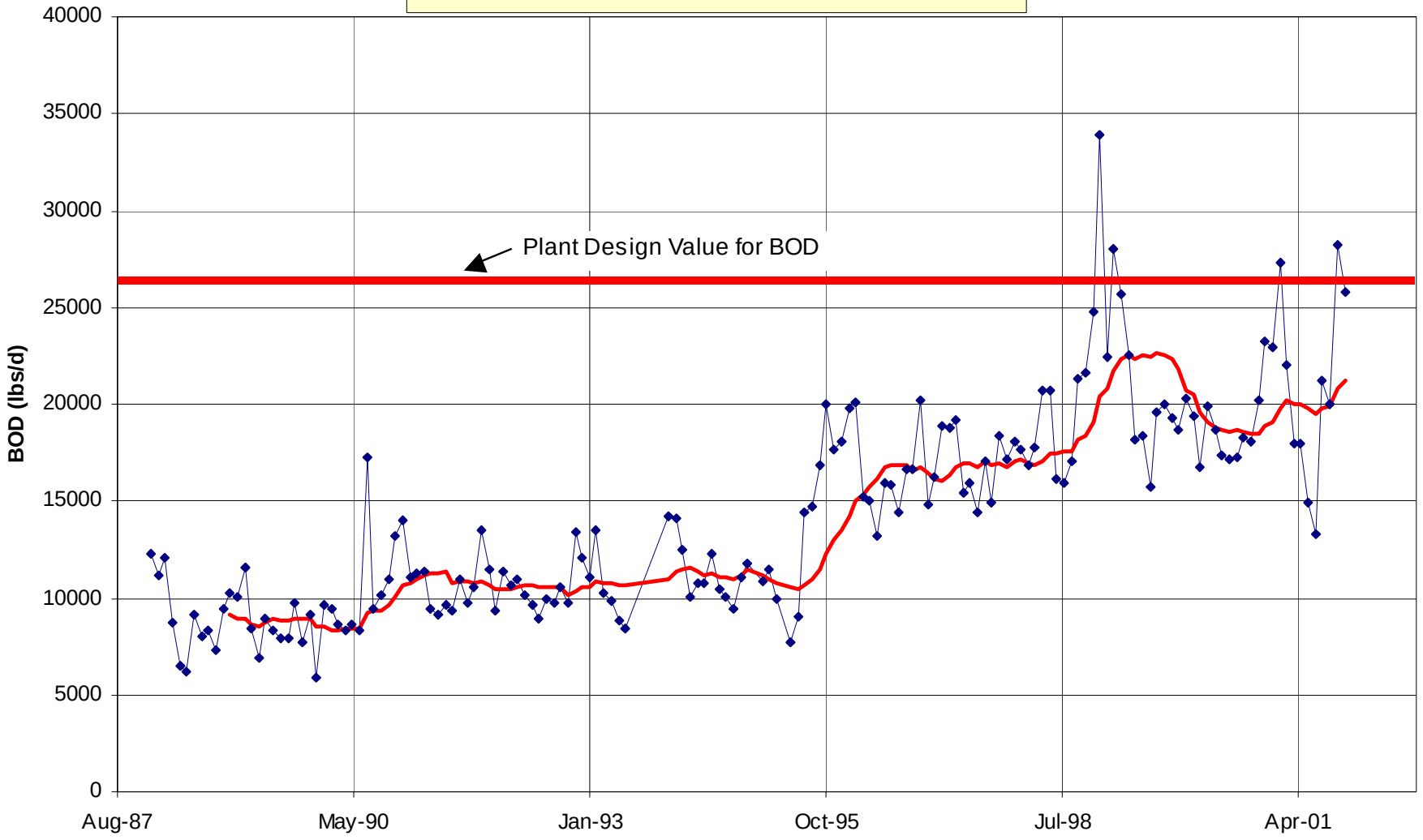
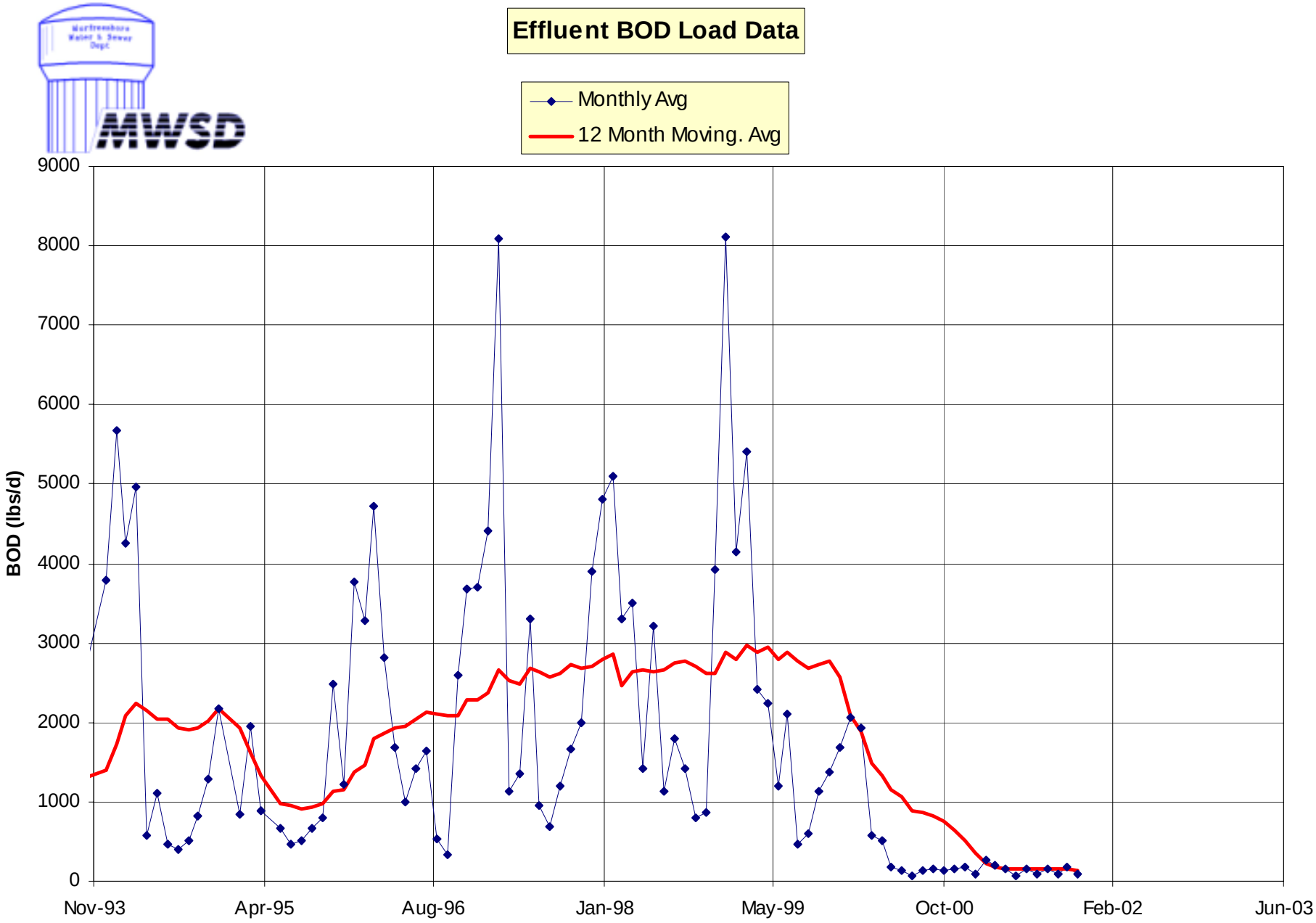
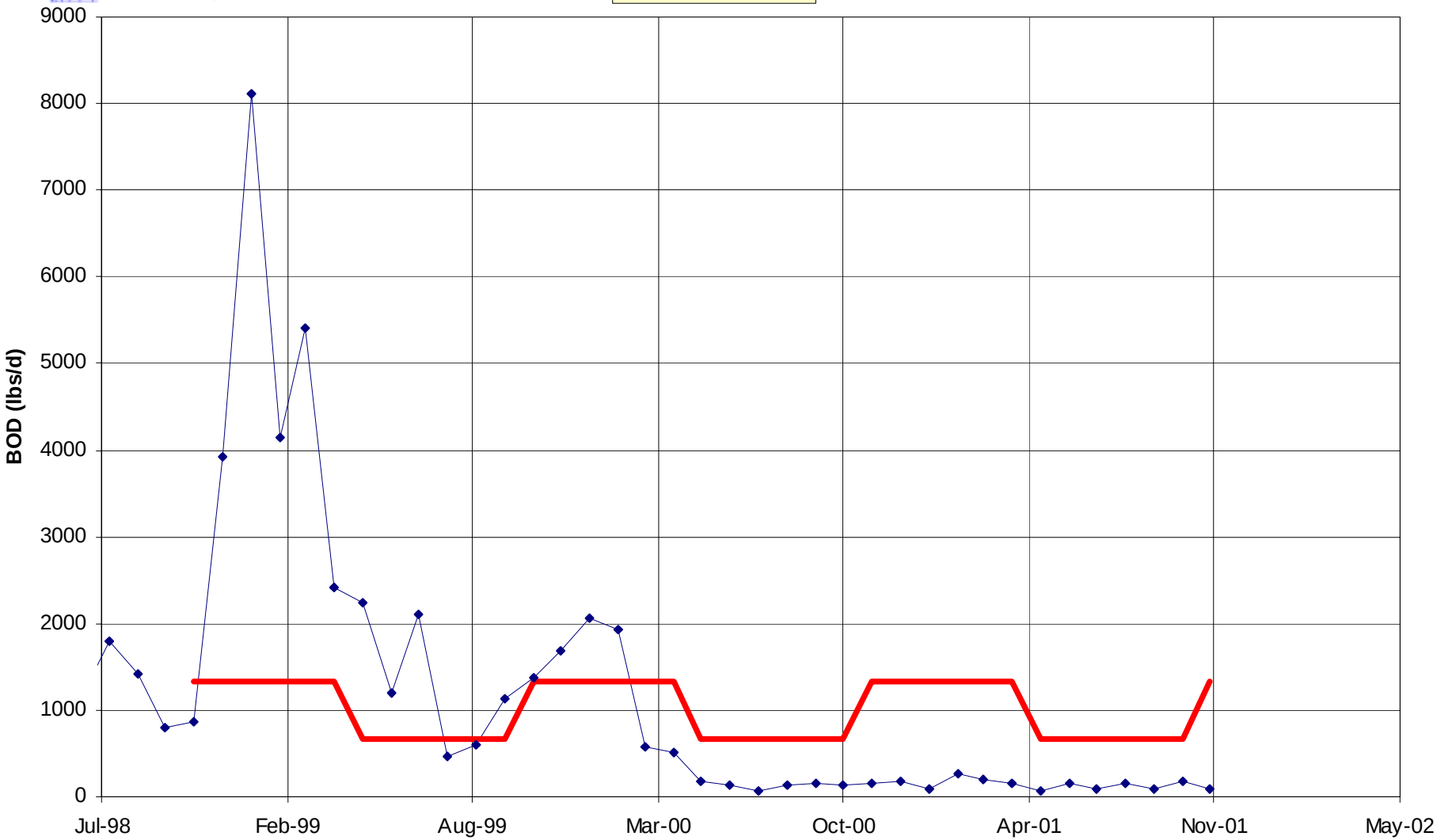

Effluent BOD Concentration Data
Monthly Avg
Monthly Max
2001 Permit Limits
BOD (mg/L)
160
140
120
100
80
60
40
20
0
Dec-98
Jul-99
Jan-00
Aug-00
Feb-01
Sep-01

Figure 6.1
Influent BOD Load Data

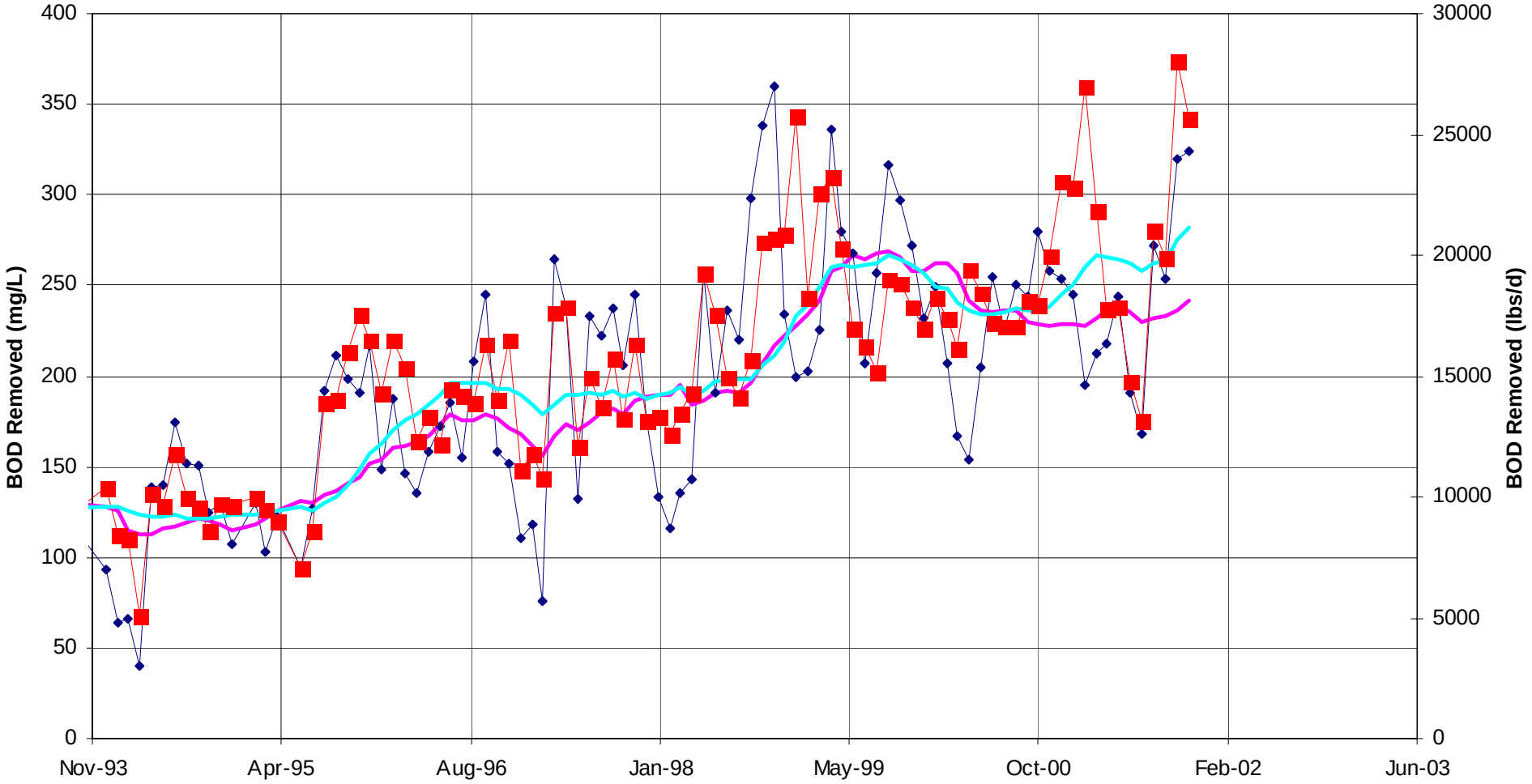


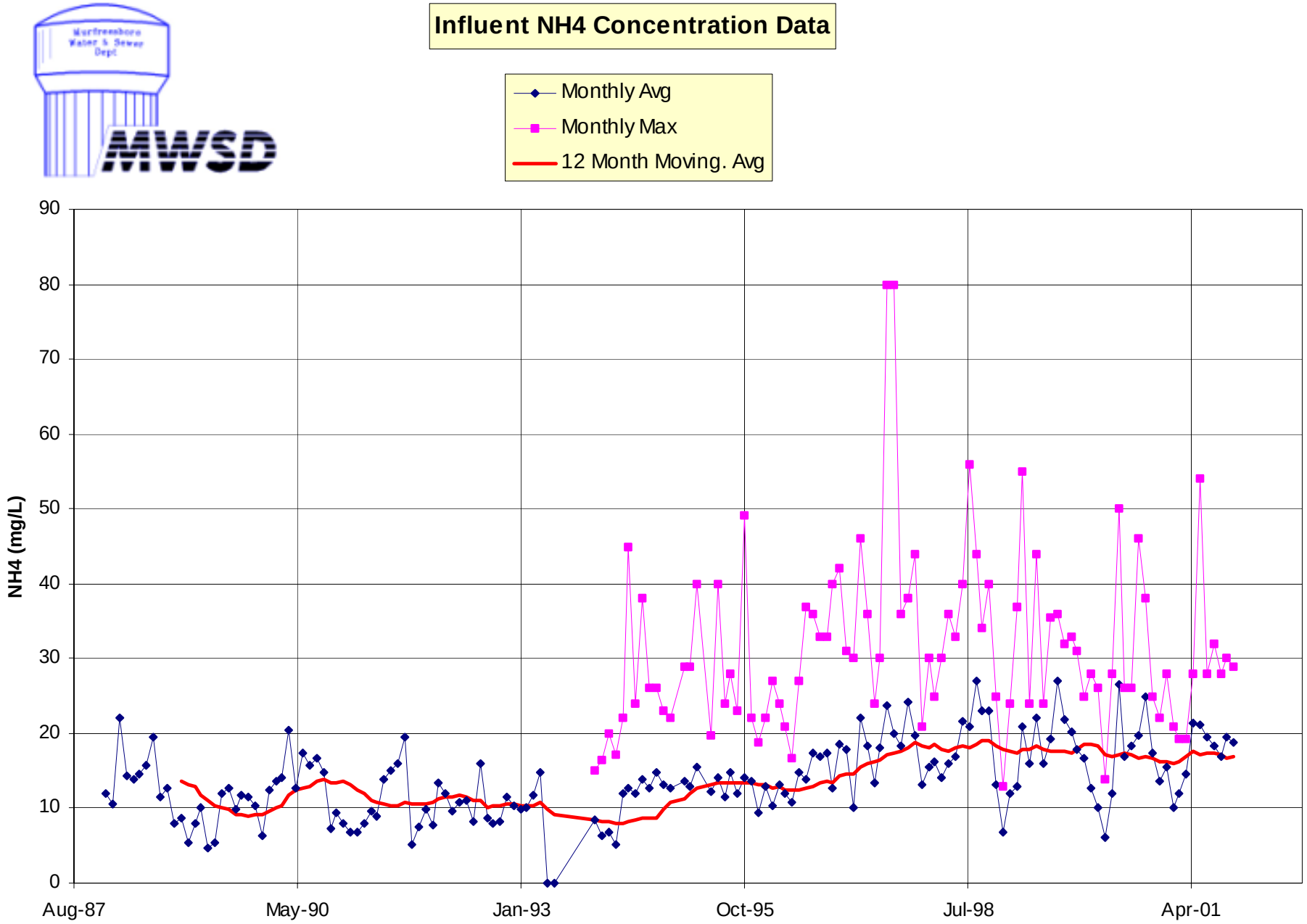

Effluent BOD Load Data
Monthly Avg
12 Month Moving. Avg
BOD (lbs/d)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Nov-93
Apr-95
Aug-96
Jan-98
May-99
Oct-00
Feb-02
Jun-03

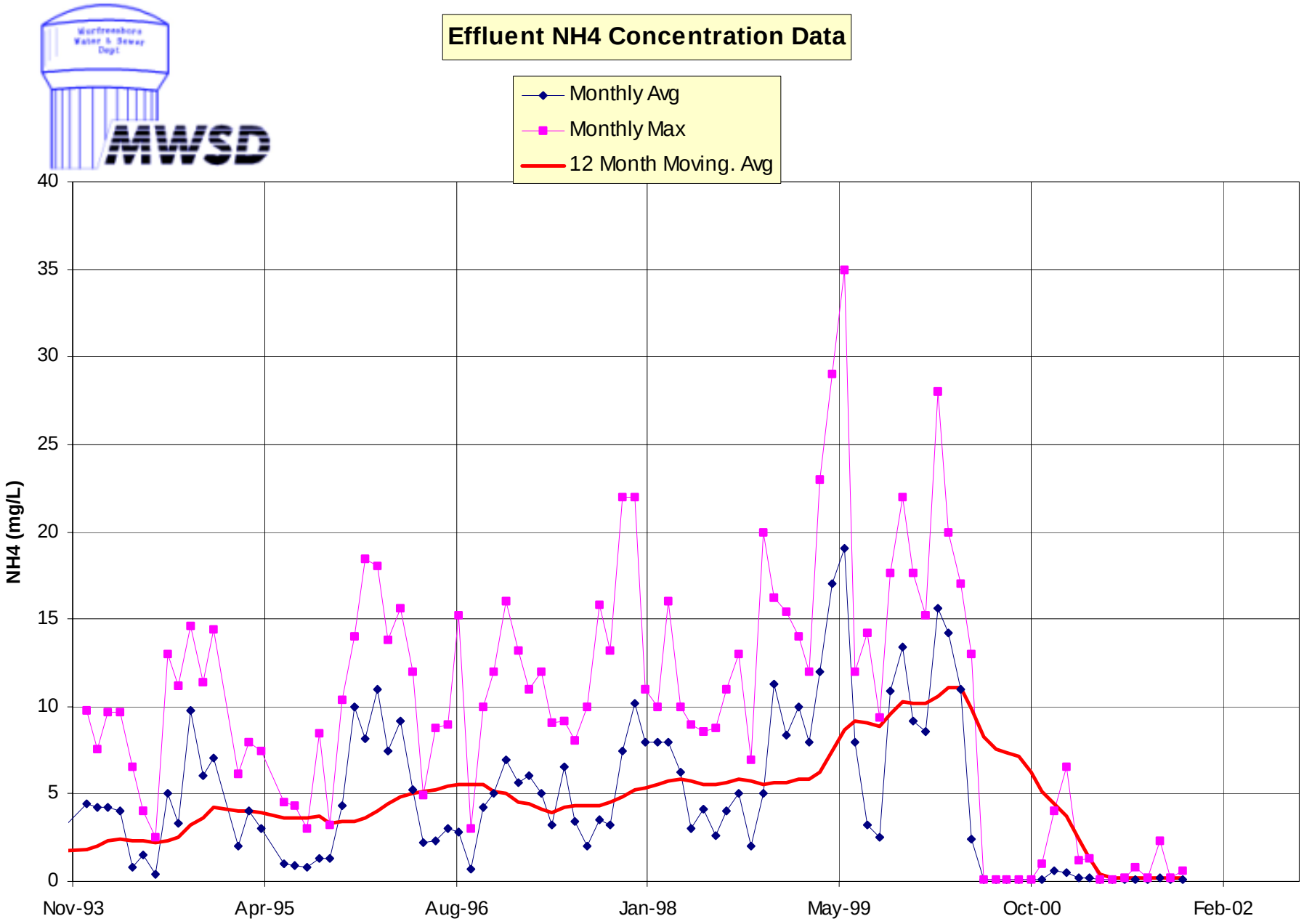
Effluent BOD Load Data



Average BOD Removal Data




Influent NH4 Concentration Data
Monthly Avg
Monthly Max
12 Month Moving. Avg
NH4 (mg/L)
90
80
70
60
50
40
30
20
10
0
Aug-87
May-90
Jan-93
Oct-95
Jul-98
Apr-01


Effluent NH4 Concentration Data
Monthly Avg
Monthly Max
12 Month Moving. Avg
NH4 (mg/L)
0
5
10
15
20
25
30
35
40
Nov-93
Apr-95
Aug-96
Jan-98
May-99
Oct-00
Feb-02

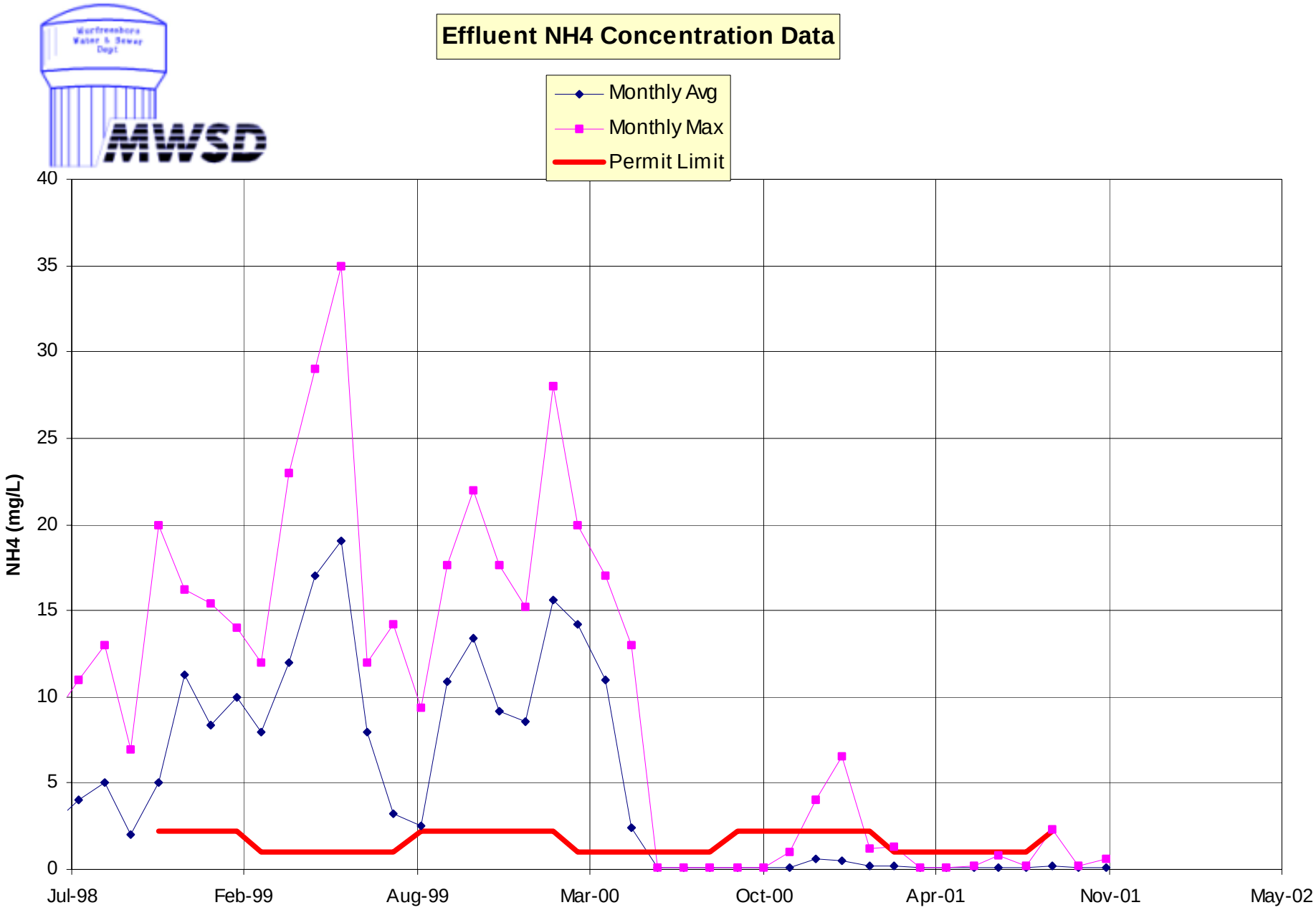
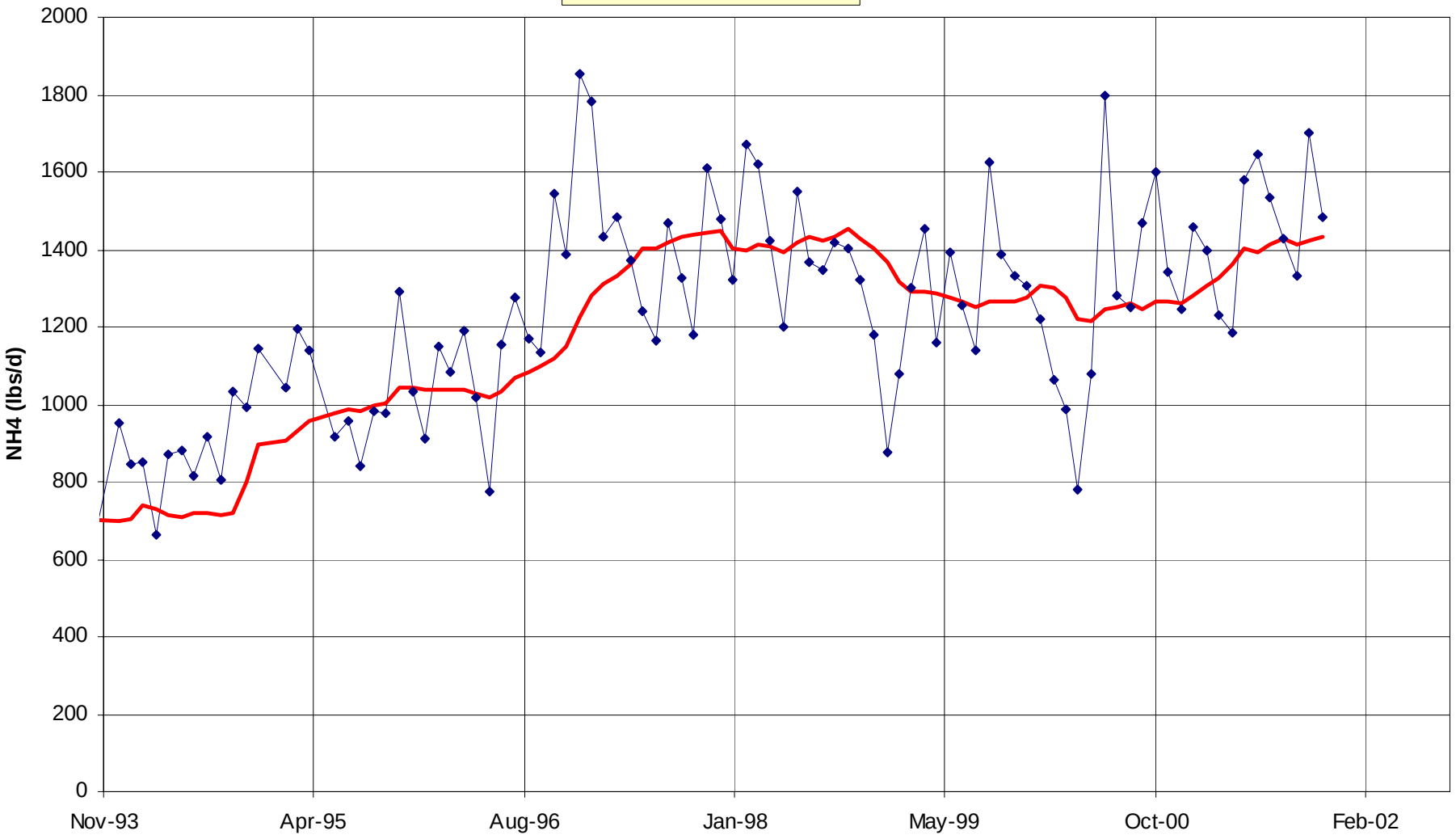
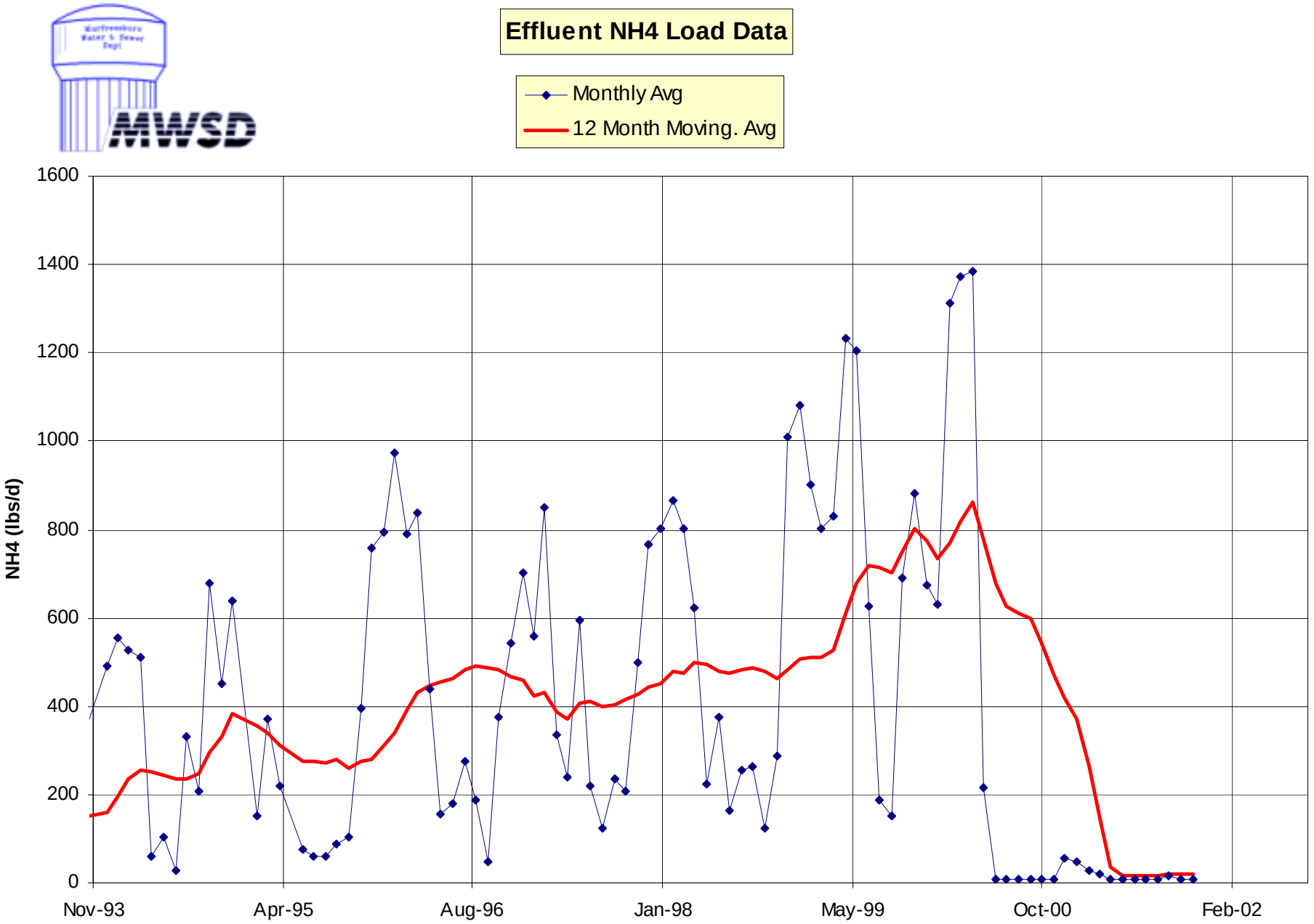
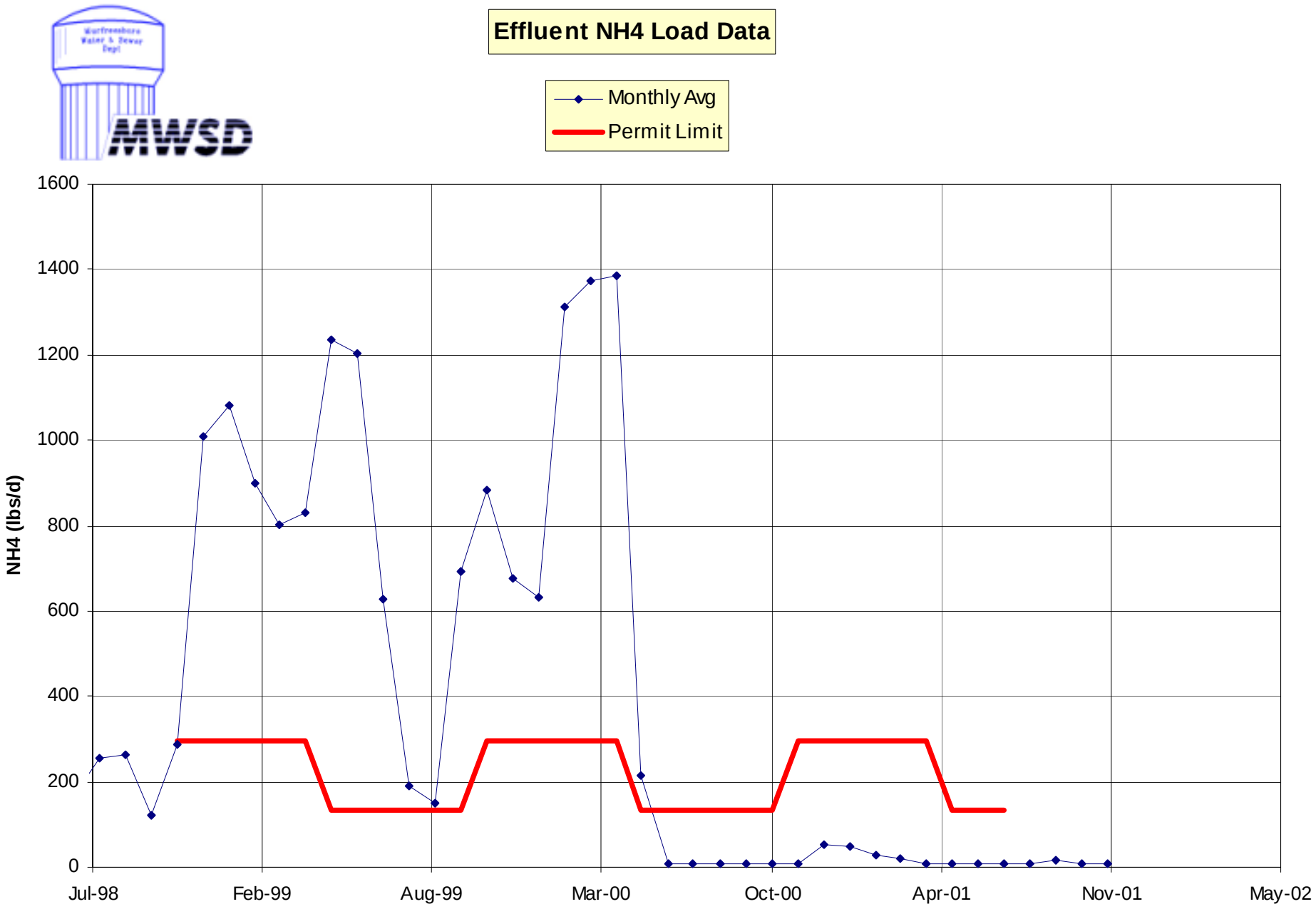

Murfreesboro Water & Sewer Dept
MWSD
Effluent NH4 Concentration Data
Monthly Avg
Monthly Max
Permit Limit
NH4 (mg/L)
0
5
10
15
20
25
30
35
40
Jul-98
Feb-99
Aug-99
Mar-00
Oct-00
Apr-01
Nov-01
May-02

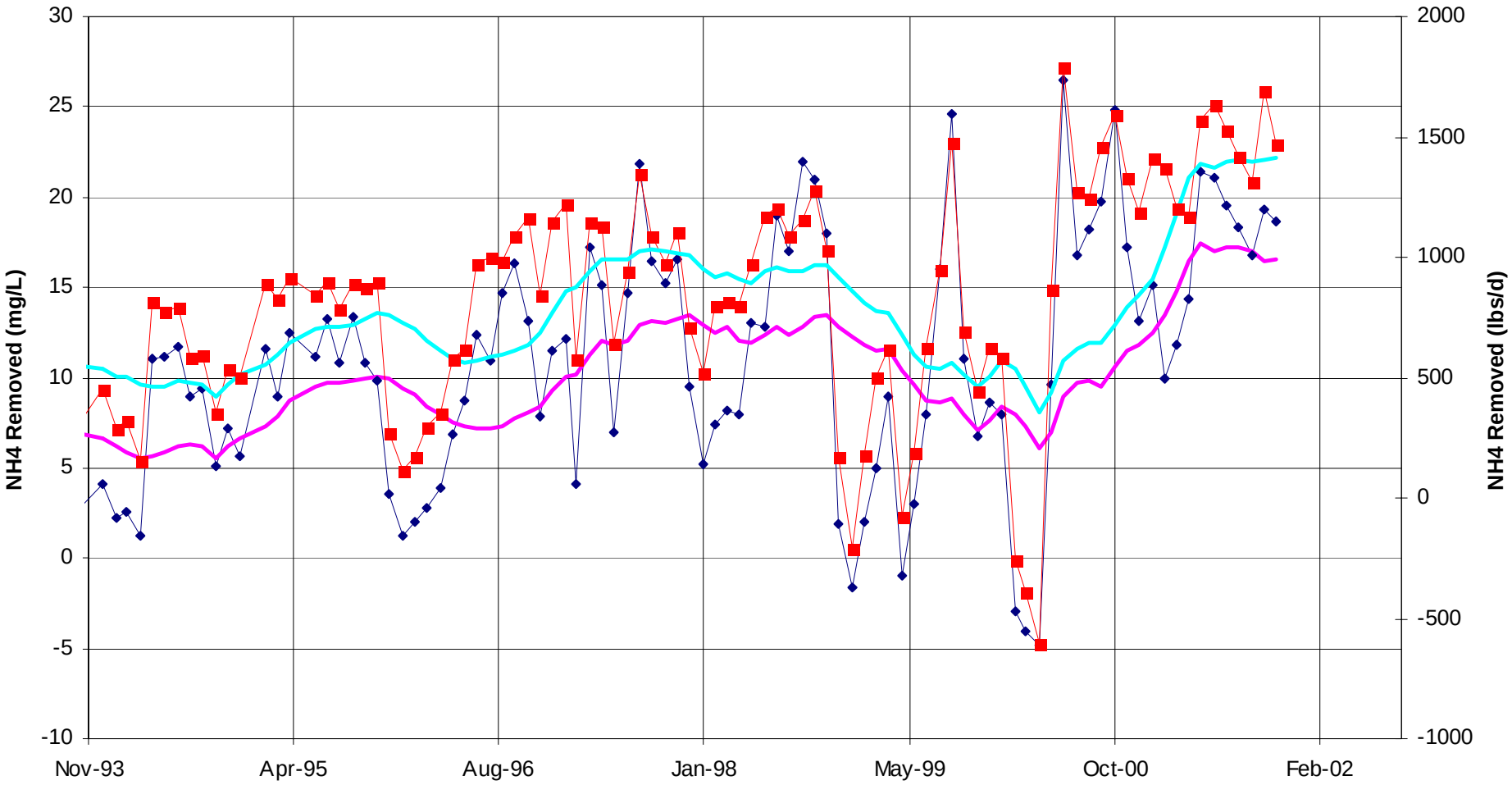
Figure 6.3
Influent NH4 Load Data

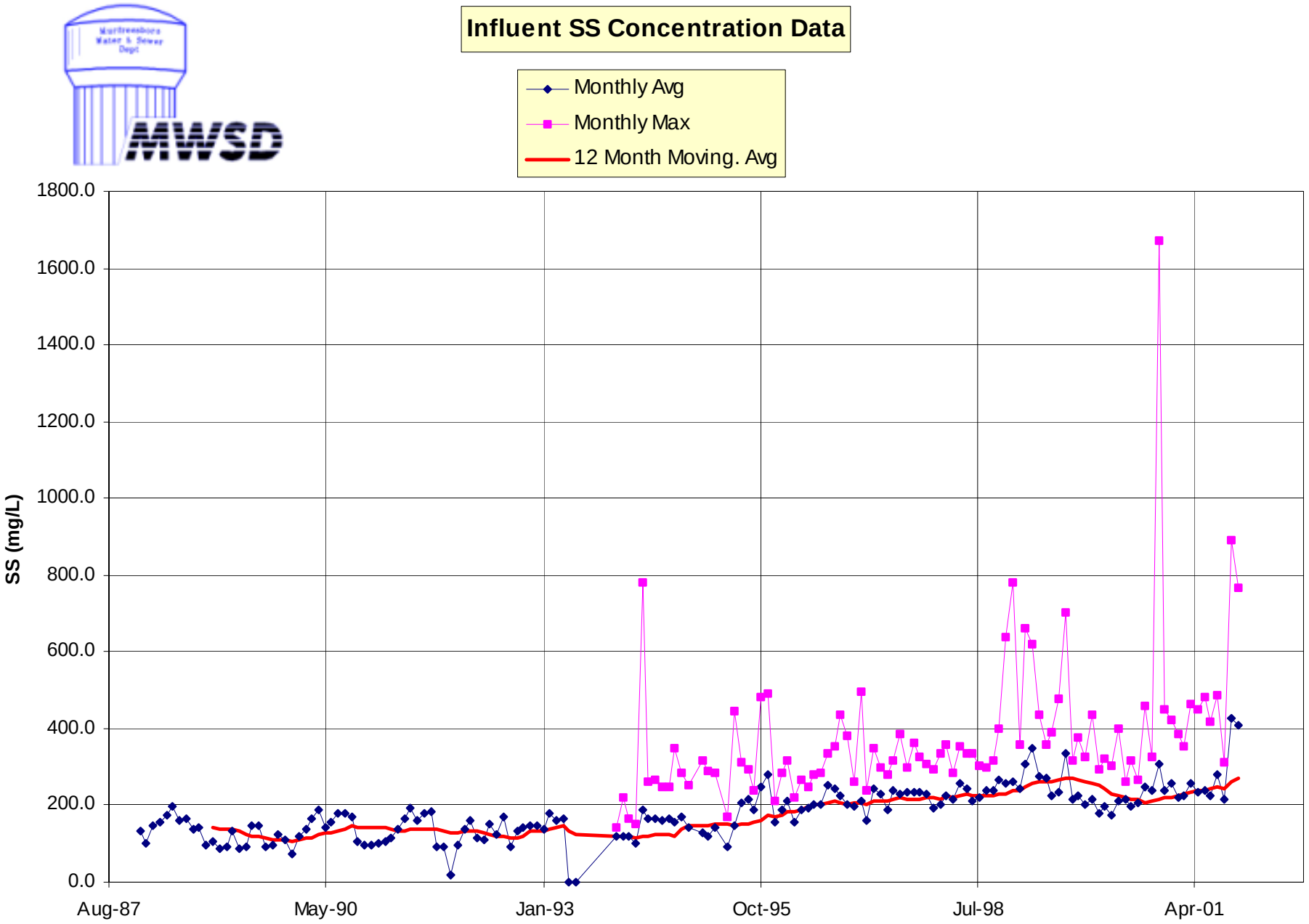


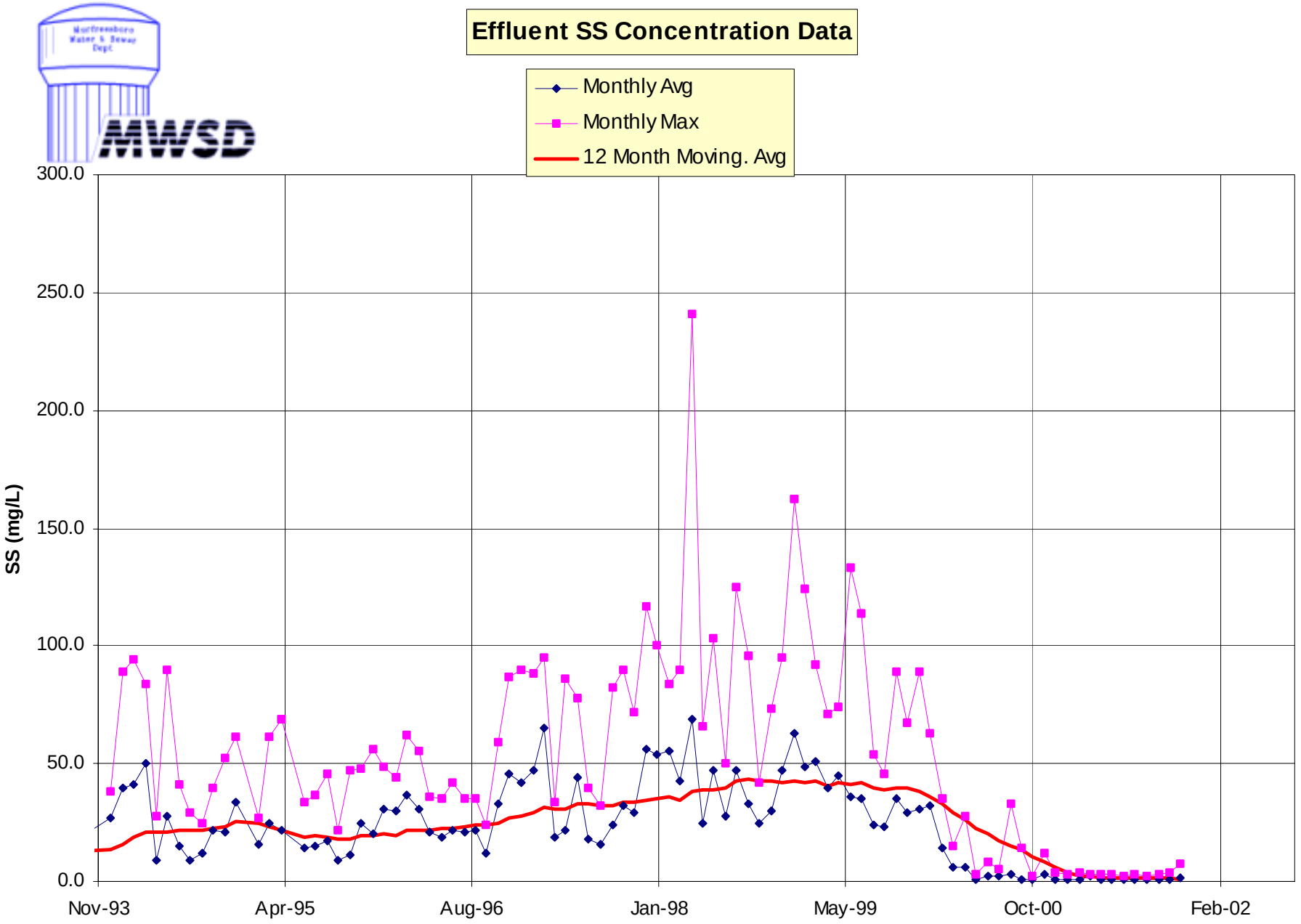

Effluent NH4 Load Data
Monthly Avg
12 Month Moving. Avg
NH4 (lbs/d)
1600
1400
1200
1000
800
600
400
200
0
Nov-93
Apr-95
Aug-96
Jan-98
May-99
Oct-00
Feb-02


Effluent NH4 Load Data
Monthly Avg
Permit Limit
NH4 (lbs/d)
1600
1400
1200
1000
800
600
400
200
0
Jul-98
Feb-99
Aug-99
Mar-00
Oct-00
Apr-01
Nov-01
May-02

Average Ammonia Nitrogen Removal Data




Influent SS Concentration Data
Monthly Avg
Monthly Max
12 Month Moving. Avg
SS (mg/L)
1800.0
1600.0
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
Aug-87
May-90
Jan-93
Oct-95
Jul-98
Apr-01


Effluent SS Concentration Data
Monthly Avg
Monthly Max
12 Month Moving. Avg
SS (mg/L)
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Nov-93
Apr-95
Aug-96
Jan-98
May-99
Oct-00
Feb-02

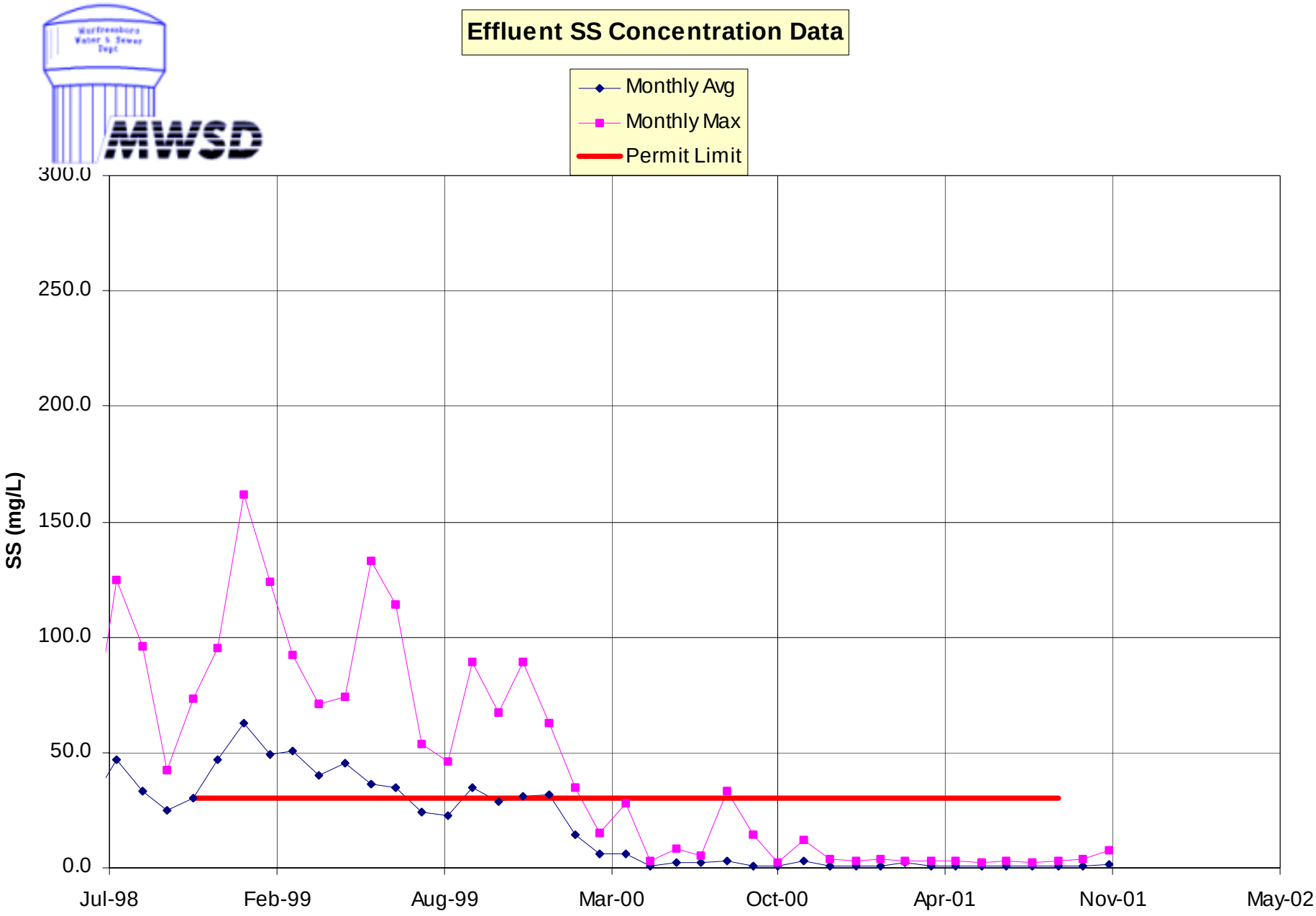
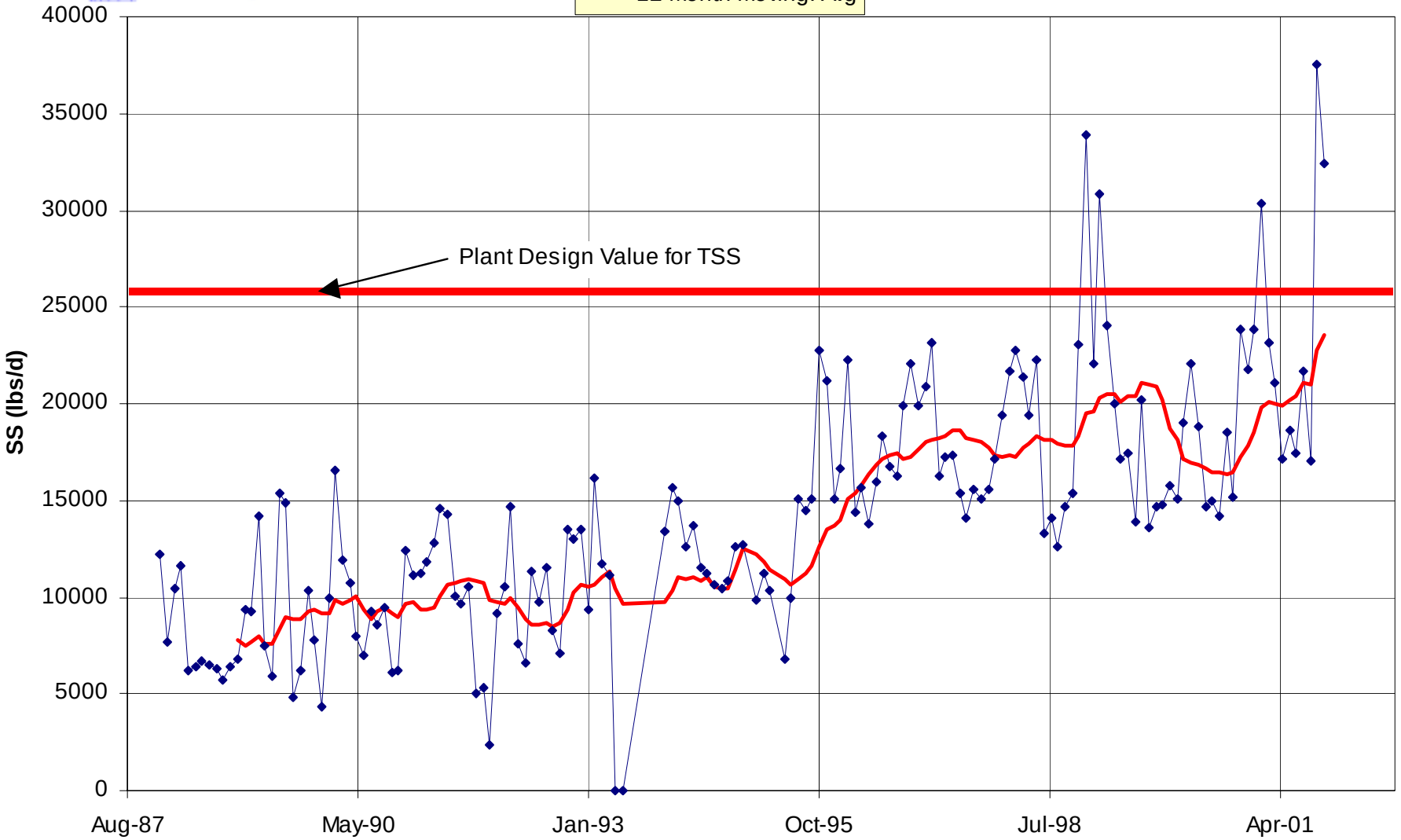
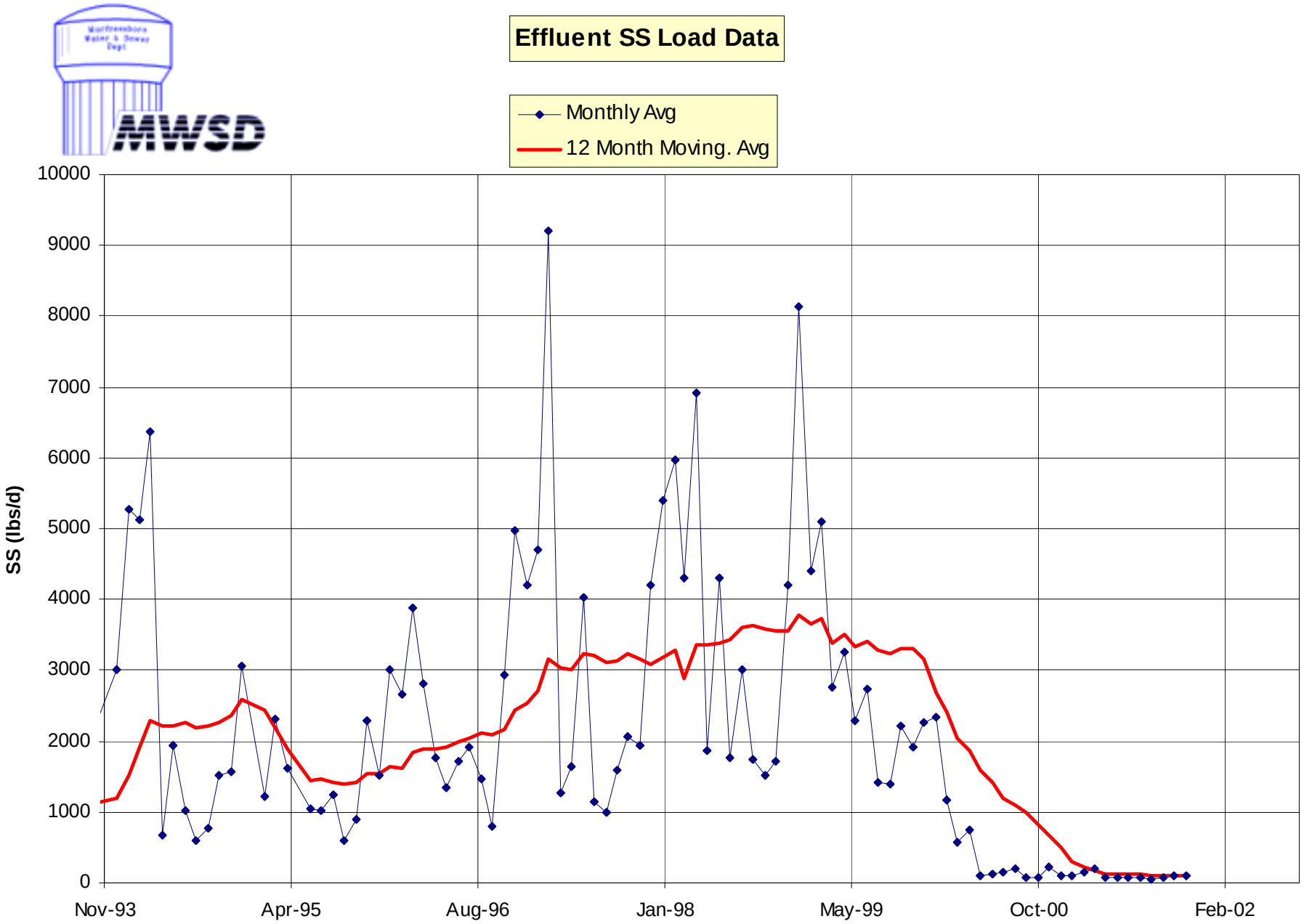
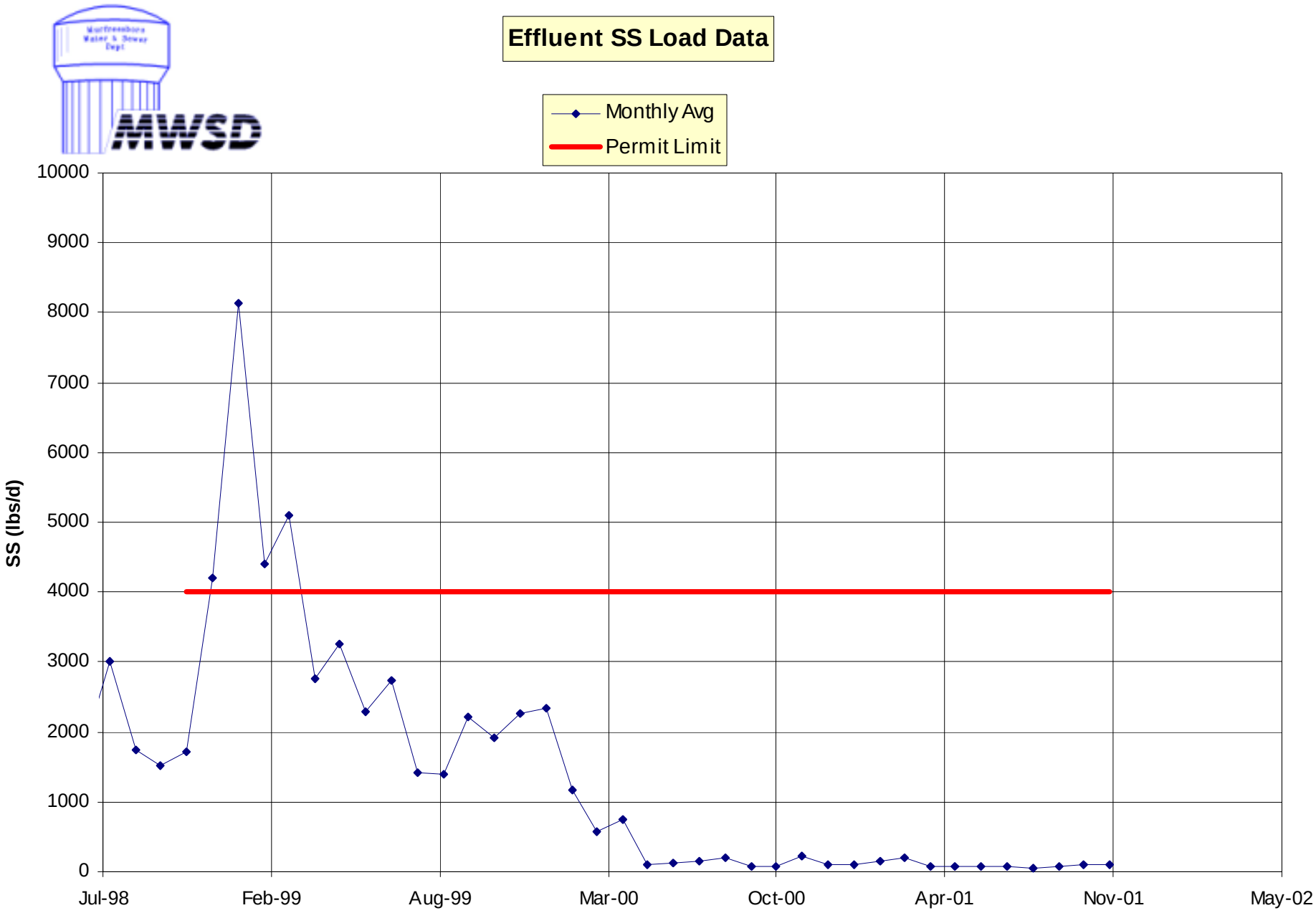
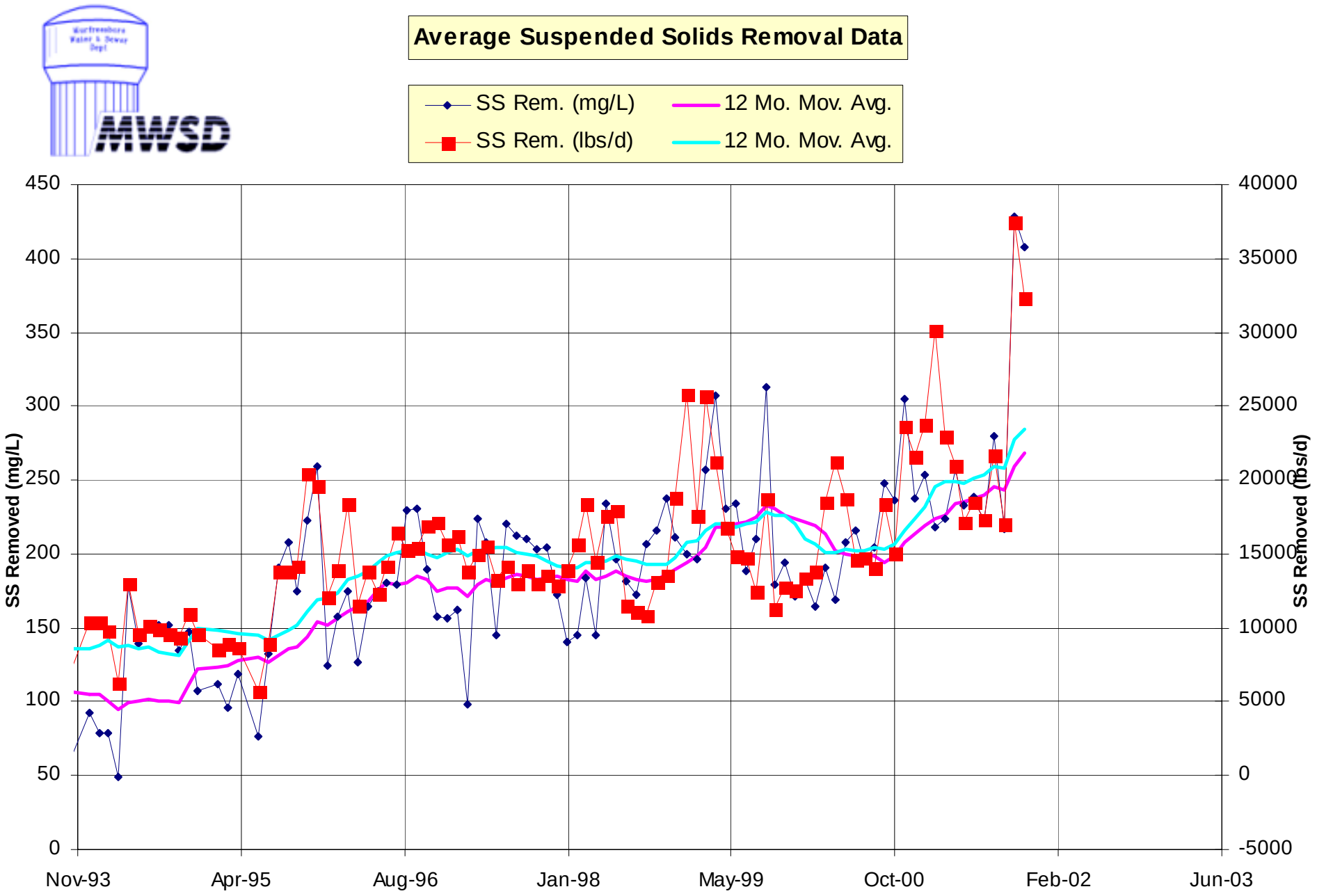

Effluent SS Concentration Data
Monthly Avg
Monthly Max
Permit Limit
SS (mg/L)
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Jul-98
Feb-99
Aug-99
Mar-00
Oct-00
Apr-01
Nov-01
May-02

Figure 6.2
Influent SS Load Data




Effluent SS Load Data
Monthly Avg
12 Month Moving. Avg
SS (lbs/d)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Nov-93
Apr-95
Aug-96
Jan-98
May-99
Oct-00
Feb-02


Effluent SS Load Data
Monthly Avg
Permit Limit
SS (lbs/d)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Jul-98
Feb-99
Aug-99
Mar-00
Oct-00
Apr-01
Nov-01
May-02


Average Suspended Solids Removal Data
SS Rem. (mg/L)
12 Mo. Mov. Avg.
SS Rem. (lbs/d)
12 Mo. Mov. Avg.
SS Removed (mg/L)
SS Removed (lbs/d)
450
400
350
300
250
200
150
100
50
0
40000
35000
30000
25000
20000
15000
10000
5000
0
-5000
Nov-93
Apr-95
Aug-96
Jan-98
May-99
Oct-00
Feb-02
Jun-03

APPENDIX C

CURRENT OPERATING BUDGET FOR THE SINKING CREEK WASTEWATER TREATMENT PLANT

PRELIMINARY BUDGET DRAFTS
WASTEWATER O & M EXPENSE PROJECTIONS
FOR BUDGET YEAR 2001-2002

DEPARTMENT WASTEWATER PLANT
DEPARTMENT HEAD RON BLANTON

		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	OPERATION SLUDGE REMOVAL							
716.000	OIL & GREASE	1,901	1,333	568	2,000	2,852	4,000	2,000
717.000	TRUCK REPAIR & MAINTENANCE	428	3,333	(2,905)	5,000	643	5,000	0
718.000	MISC. SLUDGE HAULING	2,883	8,000	(5,117)	$12,000	4,325	$4,500	(7,500)
718.001	SLUDGE CHEMICALS	31,604	37,333	(5,729)	$58,000	47,406	$85,000	29,000
719.000	SLUDGE HAULING	4,790	16,000	(11,210)	24,000	7,185	43,000	19,000
720.000	APPLICATOR REPAIRS & MAINT	155	6,667	(6,512)	10,000	232	0	(10,000)
	TOTAL	41,761	72,667	(30,906)	109,000	62,643	141,500	32,500

PRELIMINARY BUDGET DRAFTS
WASTEWATER O & M EXPENSE PROJECTIONS
FOR BUDGET YEAR 2001-02+A1482

DEPARTMENT: WASTEWATER PLANT
DEPARTMENT HEAD: RON BLANTON

	OPERATION TREATMENT	ACTUAL EXPENSE 10/1/2001	BUDGET 10/1/2001	+/- BUDGET 10/1/2001	JUN-JAN EXPENSE 10/1/2001	JAN-JUN BUDGET 10/1/2001	ESTIMATED ACTUAL EXPENSE 2000-01	ANNUAL BUDGET 2001-02	BUDGET INCREASE OR (DECREASE)
742.000	WATER	27,765	26,667	1,098	40,000	41,648	40,000	0	
743.000	ELECTRICITY	474,695	440,000	34,695	660,000	712,043	740,000	80,000	
744.000	LIME	0	0	0	0	0	0	0	
745.000	UV DISINFECTION	22,627	4,667	17,960	7,000	33,940	27,000	20,000	
746.000	NATURAL GAS	59,132	84,000	(24,868)	126,000	88,698	90,000	(36,000)	
747.000	OTHER CHEMICALS	1,212	2,667	(1,455)	4,000	1,818	2,000	(2,000)	
748.000	SULFUR DIOXIDE	0	0	0	0	0	0	0	
749.000	LAB SUPPLIES	6,218	6,667	(449)	10,000	9,327	10,000	0	
750.000	MISCELLANEOUS SUPPLIES	12,509	14,000	(1,491)	21,000	18,763	21,000	0	
751.000	TRANSPORTATION	18,390	13,333	5,057	20,000	27,585	20,000	0	
752.000	ODOR CONTROL	27,022	45,333	(18,311)	68,000	40,533	68,000	0	
753.000	UNIFORMS	6,424	7,333	(909)	11,000	9,637	11,000	0	
754.000	GREASE, OIL, GAS	3,169	2,667	502	4,000	4,754	5,000	1,000	
755.000	TELEPHONE	4,495	5,667	(1,172)	8,500	6,743	8,500	0	
756.000	STREAM MONITORING WWTP	0	10,300	(10,300)	15,450		18,500	3,050	
757.000	JANITORIAL SUPPLIES	3,120	2,333	787	3,500	4,881	3,500	0	
758.000	MONITORING	15,389	10,667	4,722	16,000	23,083	16,000	0	
759.000	MOWING WASTEWATER	319	4,000	(3,681)	6,000	479	6,000	0	
760.000	ENVIRONMENTAL FEES	1000	5,000	(4,000)	7,500	1,500	7,500	0	
760.001	SMALL TOOLS HARDWARE	866	1,667	(801)	2,500	1,299	2,500	0	
760.002	OFFICE SUPPLIES	1,915	1,667	248	2,500	2,873	2,500	0	
760.003	PHYSICAL		1,333	(1,333)	2,000		2,000	0	
	TOTAL	686,267	689,967	(3,700)	1,034,950	1,029,404	1,101,000	66,050	

PRELIMINARY BUDGET DRAFTS
WASTEWATER O & M EXPENSE PROJECTIONS
FOR BUDGET YEAR 2001-02

DEPARTMENT: WASTEWATER PLANT
DEPARTMENT HEAD: RON BLANTON

		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	MAINTENANCE TREATMENT							
762.000	STRUCTURES	18,722	4,667	14,055	7,000	28,084	7,000	0
763.000	TREATMENT	14,866	15,067	(201)	22,600	22,300	30,000	7,400
764.000	PUMPING	3,883	5,333	(1,450)	8,000	5,625	6,000	0
765.000	INSTRUMENTS	5,099	9,000	(3,901)	13,500	7,649	13,500	0
	TOTAL	42,570	34,067	8,503	51,100	63,658	58,500	7,400
	OPERATION OXYGEN PRODUCTION							
776.000	OXYGEN	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0
	INDUSTRIAL SURVEILLANCE							
791.000	LAB SUPPLIES	2,934	2,667	267	4,000	4,401	4,500	500
792.000	SAMPLERS	3,622	2,667	955	4,000	5,433	5,500	1,500
793.000	MONITORING	2,784	4,000	(1,216)	6,000	4,177	6,000	0
794.000	TRANSPORTATION	4,789	3,333	1,456	5,000	7,184	5,000	0
795.000	MISCELLANEOUS	1,468	2,000	(532)	3,000	2,203	3,000	0
796.000	UNIFORMS INDUSTRIAL SURVEILLANCE	1,100	1,467	(367)	2,200	1,650	2,200	0
	TOTAL	16,697	16,133	564	24,200	25,048	26,200	2,000
	GRAND TOTAL	787,295	812,833	(25,538)	1,219,250	1,180,953	1,327,200	107,950

APPENDIX D

MINUTES FROM PUBLIC HEARING ON MARCH 12, 2002

MINUTES
MURFREESBORO WATER AND SEWER BOARD
MARCH 12, 2002

The Murfreesboro Water and Sewer Board met on March 12, 2002 in the conference room at the Operations and Maintenance Facility at 1725 South Church Street. Present at the meeting were Board members: Clay Beach, Gary Brown, Al Carter, Tim Durham, Toby Gilley, Andrea Loughry and Don Moser. Also present were Gene Casto, Joe Kirchner, Valerie Smith, Bobby Worthington, Terry Taylor, Susan McGannon, Kenny Diehl, Mike Bernard, Doug Demosi, Ronnie Blanton, John Callow with DNJ and members of the public.

A motion was made by Mr. Brown and seconded by Mr. Gilley to elect Ms. Valerie Smith to the position of Secretary for the Board.

The motion carried by the following vote:

Mr. Beach – Aye
Mr. Brown – Aye
Dr. Carter – Aye
Mr. Durham – Aye
Mr. Gilley – Aye
Ms. Loughry – Aye
Mr. Moser – Aye

The minutes of the February 5, 2002 meeting were presented for corrections and/or deletions. Ms. Susan McGannon made a request for correction, adding the grease trap policy to the minutes, prior to the meeting and revised minutes were handed out to the board members. A motion was made by Mr. Durham and seconded by Mr. Beach to approve the minutes as corrected.

The motion carried by the following vote:

Mr. Brown – Aye
Mr. Beach - Aye
Dr. Carter – Aye
Mr. Durham – Aye
Mr. Gilley – Aye
Ms. Loughry – Aye
Mr. Moser – Aye

Next, the Board conducted a public hearing regarding the Murfreesboro Wastewater Facilities Plan, 2002 Revision. The minutes of this hearing were transcribed by: Marilyn Gorski, CCR #0174 and are as follows:

INDEX OF SPEAKERS

MR. MOSER: Good evening, I'm Don Moser, chairman of the Murfreesboro Water and Sewer Board. We are pleased to have you with us this evening.

Is everybody signed in? We've got a sheet up back there that if you haven't, we would like for you to sign in, please.

At this time, I would like to call the meeting to order. The first thing on the agenda, we need a new secretary. And we have Valerie Smith down here who has been acting as our secretary, but we need to officially appoint her as secretary, and we need a motion.

(Motion was made and seconded.)

MR. MOSER: Would you please call the roll, please?

(The roll was called and all members answered aye.)

MR. MOSER: Thank you. Now we officially have a secretary.

The next thing on the agenda is to consider the minutes of the February 5, 2002, meeting.

MR. KIRCHNER: I did lay a corrected copy in front of you. On Page 3 in green, you'll see we added where we insert there a copy of the grease trap policy. So it's included in the minutes.

MR. MOSER: On Page 3 right above where it says "security", we did insert the grease trap policy as a part of this. Motion and seconds to approve the minutes.

(Motion to approve the minutes was made and seconded, and all members answered aye.)

MR. MOSER: At this time, we would like to now start our meeting, our 201 waste facilities plan, and I would like to introduce to you Mr. Kenny Diehl with the firm of Smith, Seckman, and Reid.

MR. DIEHL: Thank you, Mr. Moser. What we're going to do tonight is I'm going to start out by reading a narrative statement. Copies are available. This is some of the things that need to be done for us to follow the rules of the public hearing.

Then I will be making a power point presentation which will be the recommended plan from the 201 facilities plan that the department has been looking at.

Finally, we will take questions from anyone of you or statements that you want it make. We would respectfully ask that you wait until the end for questions. We've provided index cards back here on the table so that you can write down your questions so that you won't forget them. And if you would, please, put your name on the index cards so we can attribute them to the right person. We would appreciate it.

To begin with the narrative statement, the purpose of this hearing is to give information and solicit public comment -- excuse me. I'm at that age where I have to change out -- on the city of Murfreesboro's 2002 update to its 201 facilities plan.

The existing 201 facilities plan was completed in 1992 and included an area encompassing approximately 180 square miles within Rutherford County.

The 1101 regional growth boundary, i.e., the urban growth boundary or UGB, expanded the planning area for the city of Murfreesboro to approximately 205 square miles.

For the purposes of the 201 facilities plan update of 2002, the planning area includes all of the UGB. In addition, areas contiguous to the UGB that drain naturally into the UGB are included in the revised planning area.

The planning area is generally boarded by the Wilson County line to the north, by the Smyrna UGB to the west, by State Highway 269 to the south, and by Murfreesboro UGB lying to the east.

Exhibit 5.1 which is right here of the facilities plan update delineates the planning boundary, and you're welcome to look at it at your leisure. A copy of this exhibit is on display here and is on display in the written document.

The planning area includes all of Overall Creek, Puckett Creek, Lytle Creek, Sinking Creek, and Bushman Creek drainage basins.

In addition, portions of the west fork of the Stones River, middle fork of the Stones River, east fork of the Stones River, Stewart Creek, and Fall Creek drainage basins are contained within the planning area.

The Murfreesboro Water and Sewer Department is responsible for wastewater collection, treatment, and disposal for the city of Murfreesboro, Tennessee.

The city's existing collection system is divided into several sanitary districts. Wastewater is conveyed to the Sinking Creek wastewater treatment plant for treatment and disposal.

The city is faced with short, intermediate, and long-term needs in regard to its wastewater facilities. Existing issues and future growth in the planning area will require an addition, collection system improvements, and increased treatment plant capacity.

This facilities plan update recommends the short-, medium-, and long-term wastewater system improvements necessary to serve the city of Murfreesboro in the planning area.

The facilities plan update estimates the construction cost of each of the proposed improvements individually. The construction may be funded in whole or in part under the State of Tennessee revolving loan program.

The scheduled construction for the recommended projects is subject to the rate of growth in the planning area and funding availability.

It is also anticipated that this plan will be updated every five to ten years depending on actual growth rates within the planning area.

This facilities plan update was prepared in accordance with Section 201 of the Federal Water Pollution Control Act Amendments of 1972. The recommended improvements in this plan are intended to provide a cost-effective, environmentally sound, and implementable approach to providing wastewater service to the present and future needs of the proposed service area.

With that, then, we'll go into the presentation. The first thing I want to do is give you an over-view of the plan itself.

The first facilities plan for the city of Murfreesboro was prepared in 1974. It was updated in 1986 and also updated in 1992, and then this update comes ten years after the '92 update and is officially the 2002 update.

We have a number of source materials that are listed in the document. We've reviewed virtually every planning document that has been available for this area for sources on the report.

The report is divided into two volumes. Volume 1 deals with the collection system. Volume 2 talks about the treatment and disposal systems.

So I want to move into an explanation of the issues regarding the collection system which is contained in Volume 1.

Murfreesboro and the service area have had a great deal of growth, as most of you are probably aware. The population of Rutherford County increased 53.2 percent in the last census.

The second issue that needed to be addressed was the expanded service area. Rutherford County has approximately 620 square miles. Murfreesboro itself is approximately 42 square miles.

In the 1992 edition of the 201, the planning area was 180 square miles; and as I mentioned in the narrative, it now includes the UGB which is about 205 and then the areas that are contiguous to the UGB that drain to the UGB naturally which includes another 27 square miles. So the total in the planning area is approximately 232 square miles.

There are aging facilities that needed to be addressed. The Sinking Creek interceptor, for instance, has been in service for 33 years. The Stones River interceptor has been in service for 28 years.

There are capacity limitations that needed to be addressed. There are certain bottlenecks within the system where the sewage does not flow in an adequate manner.

There are infiltration in-flow issues. According to the information that we have been able to gather, infiltration in-flow runs as high as 3.8 times the average daily flow in the system.

Finally, the regulatory issues and specifically the CMOM, the capacity, management, operation, and maintenance, issue which is a forthcoming regulation has been issued in preliminary form but is expected by the end of this year to eliminate all sanitary sewer overflows

from systems as early as 2011.

Let's talk a minute about the future needs. The planning period is 20 years, which means that we're looking at the 2022. According to the latest land use plans for Murfreesboro – and these have come from the planning department -- we've reviewed both the Blackman and Salem-Barfield as well as additional information from the planning office in preparing the land use estimates.

Population forecast is contained in the report in Pages 37 through 41. As you are probably aware, the city had 68,816 residents in the 2000 census. Which you may not be aware of, in the existing UGB, the population is 112,343.

By 2022, the city is expected to have 134,300 residents, and the UGB 193,200 residents. These are the information that we've gotten from the planning department.

General recommendations in regard to the collection system are as follows: We have divided them into short, medium, and long-term improvements.

The short improvements are expected to be initiated within one to five years, the medium-term improvements within five to fifteen years, and the long-range, fifteen plus years.

The monitoring program which the city undertook about ten years ago has been very helpful in trying to determine where flows are coming from and how much flow is coming from each area.

The city department has 12 permanent flow monitors in the system. We have recommended that they add three to that. In addition to that, that they have one temporary monitor available for each of the permanent monitors so that we can further classify where wastewater issues are coming from.

The CMOM issue that I talked about moments ago is something that is integral to the department's program today. Most of the components of the CMOM program are already under way. And what we're recommending as part of the general recommendations is that the department fully implement the CMOM program as will be required under the Federal regulations.

We talked about design criteria. Sewer pipes are not designed to flow full. They are designed to flow at 70 percent capacity. That allows the pipe to have extra capacity for that infiltration in-flow which may get into the system. And the idea is to build the sewer pipes big enough to keep all the wastewater in the pipes.

Regulations and codes: We talked to the department and believe that it would be advisable for codes to require that owners of lateral sewers, that being the house connection from basically the roadway to the house, maintain their pipe because they are often the source of some

or much of the II problems that inhabit the system.

Finally, under general recommendations, is that there be a five-year update cycle rather than a ten-year update cycle, that these documents be updated every five years.

The proposed short-term improvements includes ten projects. The estimated project costs are a little over -- almost 41 million.

Five projects have already been initiated by the department. I might show Table 1.1 shows all of those projects. As you can see, there's the Sinking Creek relief sewer which is planned. That's the lower portion of the sewer from where the VA sewer connects into the existing Sinking Creek and runs into the plant.

The Bushman Creek relief sewer also known as the DeJarnette Lane pump station which is in design now and will be advertised for bids in the next month or so.

Miscellaneous abandonment of the pump station Number 15, southwest relief sewer, Phase 1; the Elam Road/Buchanan Road sewer which is under design; the Salem-Barfield sewer, Phase 1, which is under design; Puckett Creek interceptor, Phase 1, which is planned; the Bradyville Road replacement sewer, which is planned; miscellaneous projects in the Cherry Lane area; and the medical center parkway project which is currently under design.

The total is right at 41 million dollars. Of that total, $22,500,000 is currently not under design.

The proposed medium-term improvements are 18 projects, estimated cost of $90,858,820. Table 1.2 shows these projects.

Without going into every one of them, it's additional work in the Cherry Lane area, a relief sewer for the VA, improvements to the Sinking Creek sewer, Phases 2 and 3, northeast relief sewer, Bushman Creek relief sewer Phase 2, Bradyville Road relief sewer, Lytle Creek Phase 1 and 2, Overall Creek interceptor Phase 1, Puckett Creek Phase 2 and 3, some miscellaneous projects, Stones River relief sewer which I'll come back to in a moment, southwest relief Phase 2, Salem-Barfield Phases 2 and 3, and US 41 State Route 840 sewer.

I said I would come back to that project known as the Stones River relief sewer. When I was talking earlier about bottlenecks in the system, one of the potential bottlenecks that we have is at the screw lift station near the golf course.

The screw lift station has a certain capacity, and we are projecting that we will exceed that capacity during this planning period.

And what we have planned to do under the medium-term improvements is to provide a new sewer which will off-load some of the increased capacity to that screw lift station and bypass the screw lift station to take the flow directly to the plant.

The long-range improvements which are proposed are ten projects, estimated construction cost, $62,516,220. They're listed in Table 1.3.

The northern collection system is the largest one, the east fork collection system being the second. And the others are the Walter Hill collection system, the Sulphur Springs Road collection system, Lytle Creek Phase 3, Salem-Barfield Phase 4, Puckett Creek Phases 4 and 5, Overall Creek Phase 3, and the Stewart Creek collection system.

So those are the improvements that are recommended under the plan, both short, medium, and long term for the collection system.

The next thing I want to talk about is Volume 2 of the report which deals with the treatment plant. The issues that face us regarding the treatment system are very similar to the ones that we had in the collection system, growing population. We're going from 68,816 to, according to the planning department, 134,300 in the planning period.

The expanded service area which I've talked about before, increased waste strength. In 1992, the five day BOD and the total suspended solids averaged about 200 milligrams per liter.

The plant, the Sinking Creek wastewater treatment plant, was designed with those parameters in mind. Those numbers have been steadily climbing, and today are over 250 milligrams per liter per day, and in some cases for some months as high as 300 milligrams per liter per day.

The effluent disposal issues: The permit, which was issued in August of 2001 became effective in October of 2001, grants the city of Murfreesboro capacity of 16 million gallons per day that they can discharge into the west fork of the Stones River.

When the new permit was issued, it doubled the amount of flow that could be discharged. At the same time, it did not increase the mass loading discharge limits at all. So what it effectively did was cut in half the mass loading limits on a per unit basis that could be discharged.

Future disposal, we believe, will require us to look at alternatives other than the west fork of the Stones River, and we will discuss this more later. But the future disposal, we'll look at land application and reuse.

Another issue is the regulatory issues which are ongoing. There are proposed new nutrient limits for phosphorus and nitrogen which will materially affect the treatment plant and will necessitate us making some changes in the long run in order to meet those limits.

Also, you may be aware that there is a TNDL study underway now by the State which may further shed light on what the capability is of the receiving stream, that being the west fork of the Stones River.

The next issue, going from the current issues, is the future needs. We need to increase

the hydraulic capacity. We've recommended that by sometime in the neighborhood of 2007, that the capacity be expanded 8 million gallons a day from 16 to 24 million gallons a day; that the increased BOD suspended solids treatment capacity be expanded from a current 26,000 pounds per day up to about 60,000 pounds per day.

We are making plans to design the plant and to retrofit the existing plant so that it will be capable of treating waste streams in the neighborhood of 300 milligrams per liter BOD and suspended solids.

We're looking at adding a phosphorus removal unit, an anaerobic unit, ahead of the main treatment system and also modifying the existing sand filters by adding methanol to cut down on the nitrogen.

As far as biosolids, we're going to need to have more capacity for that. We've made some recommendations for the on-site handling. We will retrofit some existing units, build some new units, and add to our existing filter capacity at the biosolids building.

Finally, the effluent reuse or effluent disposal options, we believe that anything over 16 MGD that the plant produces will have to be either land applied or effectively reused.

Treatment options we looked at which we believe were viable for the city to consider: One was to expand the Sinking Creek wastewater treatment plant to 24 MGD and pump the effluent to the Cumberland River for disposal.

Second was to expand the Sinking Creek wastewater treatment plant and pump the effluent to the Percy Priest reservoir using a deep discharge within the reservoir.

Thirdly, was to expand the plant and pump into a reuse system.

Fourth, to provide advanced treatment at the Sinking Creek wastewater treatment plant.

And finally, to build a new plant in the southern sector of the city.

After reviewing all of those, the one that required the least amount of capital and the one that had the lowest present work cost was this option, which is the Phase 4 expansion of the Sinking Creek wastewater plant.

It will include modifications to the pump station, to the head works, adding the phosphorus removal unit as I talked about before, a new extended aeration basin and modifications to the existing ones, a new clarifier, a new filter building, methanol storage and feed for the filters, additions to the existing ultraviolet disinfection system, and a revised handling and de-watering system for the biosolids. This expansion is slated to be AMGD.

Looking at the next -- for the reuse land application system, we've recommended that in the short-term, that the department, the city, initiate what we have termed Phase 1N Phase 1 South. They're shown on this exhibit here.

Phase 1N comes out of the existing plant site and runs over towards the VA site.

Phase 1 South connects into an existing reuse line that's already in place and runs over towards Thompson Lane to the proposed medical center site and over towards Old Fort Golf Course.

There are regulatory issues and code issues which will need to be addressed. We're looking at a time line of having this on line in the neighborhood of probably 2003 now, but initiating sometime this year.

The estimated construction cost for this first phase is 8.87 million, and that does not include land cost.

I should say also on this exhibit that we have shown certain areas that have been identified and have been asking for potential purified, repurified water to be brought to their sites for their use for irrigation purposes, and then two dedicated land application sites that have also been considered.

Phase 5 of the Sinking Creek wastewater treatment plant is proposed in a time line that is unclear at this point. That's why you see it in the neighborhood of 2017 to 2027. A lot of it depends on how fast the service area population grows how much demand there is for sewer, how much solids that we receive from the waste stream.

The estimated cost of Phase 5 -- and these are present worth dollars -- is 18.2 million.

In summary, this plan is meant to be proactive versus reactive. In 1992 when the update was done, it was in a reactive basis because the city had been having some trouble with the wastewater treatment plant that needed to be addressed.

This is a proactive stance to try to keep ahead of the curve, to try to keep the wastewater in the sewer lines which is required under the Federal government laws, and also to provide the adequate treatment capacity.

We believe this should be a living document rather than a static document, that it should change as conditions change. And that's why we've recommended that there be at least five-year updates.

As far as acknowledgments, there's a long list of acknowledgments. And at the risk of missing somebody, I won't go over them here. But everyone in the department and Joseph Aydelott and the city and the city manager's office as well as John Davis with the Rutherford County Regional Planning Commission have been very helpful and very forthcoming with information that has been beneficial to putting together a report.

So that's the short of it. And we're ready to entertain questions at this point.

MR. MOSER: Has anyone got a question they would like to ask?

MR. KIRCHNER: If you do have a question, if you would come up to the mike here, state your name and your question, and then we'll try to answer those.

If we don't have answers this evening, we'll get back with you on those. Some of them may be more in depth or whatever. But we'll certainly try to answer any questions that may come about.

If you think of something after the meeting, please get them to me. We'll try to make every effort to answer questions that you might have.

And like we said, it's a living document. Come by my office any time, and my staff and I are more than happy to sit down and talk about issues.

MR. BAINES: Mr. Kirchner and members of the Board, my name is Richard Baines. I live at 1319 Parkview Terrace in the city. And I appreciate the opportunity to speak this evening.

This is a subject that I've harassed Mr. Kirchner on for a long time, getting this information. And I want to compliment Mr. Diehl and his organization on an excellent presentation. It's one that -- it's readable for an average person like myself. There's a lot of technical data in it, and they've presented it in a very readable fashion.

However, one of my questions pertained to the actual size of the planning area. The way the report was written, at least Volume 1, it was a little bit ambiguous as to what that area encompassed. And Mr. Diehl has straightened that out, except for one statement which is on Page 65.

And I'm quoting, (as read) In addition, the planning area includes certain drainage basins which are contiguous to the UGB and drain naturally into the UGB.

And it alludes to this area being -- the UGB being an area of influence for the whole planning area. And the inference in there is that the UGB is like a catalyst that allows expansion that would be the catalyst exactly for expansion beyond its own boundaries.

In my opinion, this would be a blatant disregard for the spirit of the law, this so-called tiny town law, which was intended to limit the municipality's area of influence rather than expand it.

Topic Number 2, quoting from Page 39, (as read) Present policy requires that any development requesting sewer service must also request annexation before the Murfreesboro Water and Sewer Department will provide water and sewer service to the development.

To me, it appears that in order to circumvent its own code, the city has chosen to establish sewer assessment districts. And I'm wondering what will be the rule for the planning area that we're speaking of tonight? Will it be annexation or sewer assessment districts?

Because we've got -- seemingly, we've got two options. My personal opinion is that the

sewer assessment districts are not legal as long as the annexation code is on the books in its present form.

And I don't know if you're prepared to answer that question.

MR. KIRCHNER: What was the question again?

MR. BAINES: The question was, what is the plan for this expanded area, this area in red beyond the UGB or in the UGB? Are these going to be sewer assessment districts? Are they going to be annexed under the code?

MR. KIRCHNER: To answer your first question, as far as the area, it's defined real descriptively on this illustration 5.1.

You have your planning area in red that we have for our 201 plan. You see there. The UGB is the shaded light yellow area. Then everything you see in between is what is outside of the UGB but in our planning area.

So the majority of it is the middle fork basin. There's a little bit to the west here in the Stewarts Creek basin, and most everything else lies within that.

Sewer doesn't have -- or natural flow through these basins is not dictated by a political boundary. It's prudent on us to plan for those areas beyond the 20-year, and that's what this thing did.

So we looked at that as far as planning. Now, when that's going to be out there, of course, one of it is the Buchanan sewer that had a catalyst to go out there. So we reacted to that.

This area to the Stewarts Ferry area, there's not really anything that's been, you know, brought to the forefront on it. But you never know when something will be there.

But we thought it prudent to look at those areas so that we could make sure that the plant capacity was there and plan for those things.

Now, whether the -- what will be the norm? There won't be a norm as far as an assessment district or annexation. That's going to be done on a case-by-case basis. You've got to look at the project, is basically what we have done.

If there's a large area, we've normally looked at as an assessment district. The reason from that is that we've heard loud and clear from a lot of people that growth ought to pay for itself. So we've tried to get through the assessment districts for those that are using it and expanding, that they would pay for that system.

Now, the code requires owners in that area to request annexation. And the planning commission would -- the city planning commission would consider those requests on their own merits.

It doesn't mean that they will have to be annexed. It would depend on how efficiently

and how well the city could provide other services.

So I think as to whether it would be annexed or not, it would not be a question whether sewer is going to be provided or not. It's going to be a question of what other services could be effectively provided to those areas.

An area could be sewered outside of the city limits, but there are some stipulations required of that. If they do develop something outside the city on sewer, then they're required to construct within that subdivision per our regulations. So it's going to have curb and gutter, it's going to have storm drainage, it's going to have sanitary sewer, those type things. It's going to have the fire protection.

So it can go outside the city. Whether it's going to be annexed or not is going to be something that will be studied by the planning commission in its due diligence, will look at whether annexation is the thing to do or not to do.

MR. BAINES: I think my question is, this is kind of like a chicken and egg thing. What comes first, the sewer or the request?

MR. KIRCHNER: The request for --

MR. BAINES: The code says -- and I may be wrong -- but I think the code says direct request for annexation must proceed request for sewer before the board will act on it.

MR. KIRCHNER: No, I believe they go concurrent, that the owner has to request annexation. And as in the whole purpose of the contract that's stated in there of stipulations, it said they could continue on with their planning and things in their project while it's being considered for annexation.

Then at that point, it would be up or down on the annexation. If it's down, it would be under a contract with the city. It would be provided sewer service. If it's decided to annex it, then they would move forward with the annexation.

MR. BAINES: Okay.

MR. DIEHL: Mr. Baines asked a real good question. Number one, in regard to the comment regarding the areas outside of the UGB which drain into the UGB. One of the things that I didn't make clear is the effort on the environmental protection agency's part to go to a water shed approach in taking care of the pollution within a given water shed.

So part of the reasoning behind us going outside of that political boundary was to look at the water shed, because the city is doing a pretty major study right now in regard to water shed management that's outside of this report. But those portions of the water shed that are within the city limits, they have to clean up.

And so part of the reasoning in looking at this in this manner was to hopefully help keep

any pollutants from getting into the water shed before they got in.

So it's really trying to look at the water shed as a whole. I didn't make that clear the first time.

MR. BAINES: I'm glad you brought that topic up because it was topic Number 3 on my list.

Storm water run-off upstream from Murfreesboro has been a major contributing factor to the problem at the wastewater treatment facility. Correct? That came from your company. That was quoted, and I think it was even said, The major problems are upstream from Murfreesboro. I would have to dig up the document but --

MR. DIEHL: We're not doing that study, but let me tell you what I know. The State maintains what is known as a 303-D list as required by the environmental protection agency. And west fork of the Stones River and the middle fork of the Stones River are both contained on that 303-D list.

They're on the 303-D list for non-point source pollutions, not for point source. So what that says or what the State is saying is that the reason that the streams are on the 303-D list are not because of the wastewater treatment plant itself. It's because of conditions upstream of the wastewater treatment plant coming from farm land run-off, from run-off from other places that are getting into the stream.

So again, it's within the water shed. Does that clarify what you were asking?

MR. BAINES: I already knew that.

MR. DIEHL: Okay.

MR. BAINES: Because you did not get into that much detail in your report -- like you said, that's not your balliwick. It's not even the water and sewer. It's a city engineering project.

But it's kind of a Catch 22 situation. It's like taking a problem out of one pocket and putting it into another because development is part of this. When an area is developed, the run-off has to be not only controlled, but it has to be treated. It's going to have to be treated.

The NPDS regulations and the 201 regulations that we're talking about tonight are separate legal issues. But they're nevertheless technically joined at the hip. Would you agree with that?

When you run a sewer -- and that is topic Number 4, population density as it relates to sewer service. And I'm quoting Mr. Aydelott in the Daily News Journal in an article, (as read) Annexations are usually requested to take advantage of sanitary sewer. Sewer tends to raise property values and provide more convenience and provide more housing density.

And therein lies the problems, not controlling not only growth but it's controlling density

because that's where the problems come in. The housing -- the density, the number of units in a given area, impacts both the sewer system and the storm water run-off.

We frequently here the often repeated mantra, Growth is inevitable. And this is true. Just as often, we hear those who ask that growth be controlled labeled as being anti-growth. And I can assure you that I am not anti-growth.

When I speak of controlled growth, I'm referring to controlled density. It's the population density of an area that puts the overload on schools, infrastructure, and services.

Again, I repeat that the one service that impacts population density more than any other is sanitary sewers. There could be a lot of things impact growth, but the one that impacts density is sanitary sewers because you can change your zoning to, as you well know inside the city, from 15 to 12 to 10 to whatever when you have sewers. Without sewers, you cannot do that.

It's a genie that when let out of the bottle can create more problems than it solves. So who should be in charge of the bottle and who should make the decisions as to when to let the genie out? The governing entity or developers?

In today's world, indications are that it is the latter. The officials elected by the people inside this planning area can be stripped of their ability to represent the wishes of those who elected them by the actions of this board and the city council.

Topic Number 5 --

MR. KIRCHNER: Before you leave that topic, just to make sure we clarify some things, the city is -- a lot of these things cross departmental lines. And the city is making every effort to, I think, look at these areas.

Case in point is that the Blackman study area that was done when the school was initiated and the Overall Creek sewer, the city initiated a study that included a citizens advisory group, people that lived in that area, to look at these things as far as the density and how they would like to see it developed.

And that is, you know, what you're talking about, letting those in those areas plan on those things.

In addition to that, they also undertook this Salem Highway study area. So those are two studies that have been undertaken. And the efforts in what you're talking about is to look at those densities. They look at -- you know, we don't want all multi-family. We don't want all, you know, commercial in an area. But they look to try to balance those things.

And those two particular studies, I think, the citizens in that area had a voice and they had every opportunity to come and comment on those plans.

So I think that's what you're going to see is the norm in the future when we have these

larger areas, that we'll start seeing more of these plans that will be developed jointly with the county planning commission and the city planning commission, because there was much discussion on both sides of those areas because much of those areas right now are in the county.

MR. BAINES: That's good, and I agree with you. That's the way it should be driven.

At the other end of the spectrum, you'll see the confusion out at the Buchanan exit, that proposed area. If that area were treated as the Blackman area was, if it was that much attention paid to it and the people out there had that much input, I think everybody would feel a little bit more comfortable.

I'll tell you what with the problem as I see it is right now -- and we may have the tail wagging the dog -- is that the county commission has failed to attach a definition to the word rural.

And that is the very basis of the law, the UGB boundary law, that to separate rural from what will be municipalities.

Now, as it exists now, I think the definition of rural is RS-15 or is it 20? 15. Okay. Now, I live in an RS-15 zone. Much of Murfreesboro is RS-15. That is not the definition of rural.

And until the county gets off its duff and identifies what is rural by -- I saw one proposal which made sense, RS-40 -- we're going to be stuck right here, that developers are able to take the board and the sewer services from Murfreesboro and dictate not only where the growth is going to be but how dense it's going to be.

And the people that are electing these people are powerless. They have no voice in it. That's not the subject of this meeting, and I'll get off of it. Thank you.

Topic Number 5: Who is going to pay for this expansion to the system? In essence, I and those like me are paying an ever increasing sewer tax. That's who I feel is going to pay for it.

I've heard that the developer and eventually the person who ties into the service pays for it. But who finances it and co-signs the note with the Tennessee Municipal League or the bond holder? And where does the ever increasing amount held in reserves come from? Me and the others who pay sewer taxes.

If growth or expansion of the sanitary sewer system was even close to paying for itself, my water bill would not be going up at the rate that it has. Updating the system technically would not drive the rates up that high.

It's obvious that the income from the fees generated by new users is not enough to keep pace with the capital required by demand for expanded areas of growth.

The fact is evidenced by the statement in this report, Page 54, financing, the second

paragraph which reads, and I'm quoting, (as read) In some case, the length of time required to fully build out areas within assessment districts may exceed the period established by ordinance. In such cases, the ordinance should be amended to allow sufficient time for full recovery of Murfreesboro Water and Sewer Department costs within individual assessment districts.

I'm of the opinion that if there is any risk of not recovering your cost, our costs, within the time period -- and I think it's currently 15 years -- the project should not go forward, period.

I'm concerned that there's a point where developments that are very large and those who are not going to buy their water from Murfreesboro pose a threat to timely recovery of costs under the current assessment district's set-up.

The Buchanan Elam Road sanitary sewer assessment district is going to require 8.4 million to build, and it's going to be repaid over a period of 15 years. How does this sewer extension benefit me if it's not going to add anyone to the city property tax roles?

Mr. Kirchner has pointed out that one of the problems that the water and sewer department has in recovering costs is increasing numbers of SFU's, which is single family units -- you all know that -- on city sewers but not on city water.

Yet this proposal by and large promotes more of the same, and it just doesn't make sense. It seems like we're digging ourselves a hole.

In conclusion, I appreciate your attention and the opportunity to speak here tonight. And any questions or comments?

MR. KIRCHNER: Mr. Baines, I would like to make one comment to your last statement in that what happens if we don't expand sewer into these areas? Development will occur. It will occur on septic tanks.

As the city grows, those areas may be annexed, may or may not. They may be annexed.

What happens if sewer is put in place on the front end, the developer pays for all the costs of the water and sewer in the subdivision within that planned development.

So that's paid for without city dollars, without your dollars. If you wait until, say, 20 years down the road when a development has already been put in and it's on septic tank, it gets annexed, then I guarantee you those people are going to be clambering to the city council and to this board, asking, Well, you need to put sewer in our subdivision.

Well, then it becomes an issue of how do you fund it then? In a lot of those projects, I don't think those people could afford the cost of putting a system in if they had to pay for it for that subdivision.

So I think by putting in the trunk lines, then allowing the developers to put the subdivisions on it and pay for all that infrastructure, not just sewer but also the water, the storm

drainage, the curb, the gutters and things, then that saves us in the long term millions of dollars.

MR. BAINES: You're exactly right. But if the developer can't afford it, how can you assume that I can afford it? Because what I'm asking for is to re-examine the system that we have now.

That developer should put something into the kitty, something toward the water and sewer department's reserves, because these costs are going up, up, up.

I haven't been down to city hall, but I'm going down there and I'm going to look at your budget and I'm going to look at the rise in your debt service, because that tells me, you know, how much money you're going to have to borrow, how much you are borrowing.

And I know where that money comes from. It comes from me. That's exactly where it comes from. And it's my feeling that that developer ought to be kicking in something toward that reserve at the front end.

I mean, I understand that it costs millions of dollars to put these lines in, and there's no developer here big enough to afford that. But neither am I big enough to keep on affording to have my sewer and my sewer tax -- and I call it a tax -- go up and up and up. And it's tied directly to expansion.

I can stand upgrading the systems because they need to be upgraded. I can stand paying more to have the systems retrofitted. But I cannot stand to be part of financing growth out into the county.

And that's what I'm asking, some way of innovative financing. So give it some thought, because you're heading into a direction that I'm very uncomfortable with. And I'm just looking for the other shoe to drop in the city of Murfreesboro especially when this storm water treatment discovery mandated thing, which is not funded by any Federal agency -- it's going to come right out of our pockets -- when that puppy hits, we're going to have some more problems, some more costs.

Again, thank you for your time.

MR. MOSER: Mr. Baines, thank you very much. We appreciate it. We have a gentleman back here who would like to --

MR. DIAMOND: My name is Paul Diamond. I come from the Christiana-Buchanan area, and I have several questions.

One question is Mr. Farrer and Buchanan Estates: Now, you're saying that he's paying for most of this or will be? Well, if I read his contract correctly, not the way the Daily News Journal reported it, he is paying nothing. He is paying a thousand dollars for every house hooked up.

And in fact, if there are more houses than his quota, he doesn't even have to pay that. So let's be straight about these things.

We have copies of the contract. And let's get some other things straight. If I remember, when Buchanan Estates was presented at the city council, it was on a request of annexation. And the city was going to provide all the city services.

Would you believe it? The mayor and the city manager said, Oh -- this would be two or three weeks, I guess it was at the last meeting, they said, Oh, well, I don't think we have the funds for doing this.

So I guess there went the city fire department. There went the storm water drainage. But we still have those little plastic curbs, no problem. But city inspection of houses? Oh, no, we can't do that. We don't have enough inspectors.

So you get a little glimpse of why you're going to hear some hostility in my voice that what you say is not really what you always do.

Now, let's talk about all this contamination coming from upstream. Well, I don't remember seeing middle fork of Stones River contaminated. And in fact, I sure don't see where the water stream going through Mr. Farrer's property is contaminated. It was labeled fair.

And in fact, in my petition signing days, I remember seeing the current planning of Murfreesboro where in the Cason Lane area, there was subdivision water going like a full-blown stream just pouring off the macadam, carrying with it the phosphates from the soaps and fertilizers on the lawns, going straight into Stones River, just pouring in.

So where is the contamination coming? From all those cows? What do you think, this is Texas now? You know, the sale barn is gone out of Murfreesboro, long gone. Where are all the cows and cattle and contamination?

I suggest you all take a ride just out in the country and see what's left; or go to the Co-op, ask them how many active farms are really putting all this stuff in the streams. I don't think it's there.

The other question comes up, the drainage areas. And this is of particular concern because I kept saying, gee, whiz, do we have to put the sewers in the stream?

It seems to me that that's not a very logical option because of contamination of the water and then further contamination if the streams are going to be used for storm water drainage.

And then I was just -- you know, always that was down played. Oh, no, you can't use, you know, a forced main system. You just have to go with gravity flow.

And then you try to find out, well, gee, I wonder if they have gravity flow in San Francisco, you know, or New York? I mean, how do they get sewers in these places?

There are some places in Murfreesboro proper, by the way, where sewer doesn't go uphill, some places where within two blocks from city hall that doesn't have sewers because we can't get it uphill yet.

And that's left up to the individual owner, which is also what we're going to do. The owner of the house is going to be responsible for his share of the line.

Well, I think that when the school board met, they showed for $400,000, you could take a forced main system and take it to the school. And in fact, they didn't want to hear any of it. All they wanted the city for is a place to dump their effluent, and they didn't need any streams.

So I think all of this is going on without any participation of county government to have anyone from the county saying what we plan to do with storm water drainage.

And as you know, the storm water drainage for Stones River is on the northern side of these hills just in front of Beech Grove that runs all the way parallel. That's where it is.

And I haven't seen any study for the city that discusses in any detail nor for that matter from TDEC where they haven't done a whole lot of study. Nobody really knows what's out there.

So I see piecemeal kind of things going on. And I'm not really too happy with what I see as storm water in lots of places from the city just pouring directly into the stream and then saying, Oh, yeah, the contaminants come way from, you know, up there in those rural parts.

I think you need -- and as far as people participating in what is going to be put in their neighborhood, let's face it. When a developer puts up a 2100-home subdivision without fire or water or police support and gets the okay for annexation by Murfreesboro which denied any participation, any real participation -- since we're in the county, we have no vote -- then you've got to say, Who's holding the big stick?

So you appoint a committee. Well, we all know what constitutes appointed committees. The county can appoint any kind of committee. The city can appoint any kind of committee because the city is pulling the county.

And I grant you, the county is slow, but not slow -- doesn't mean the residents who live there are slow. I think we're pretty much aware of what's going on. Thank you.

MR. MOSER: Thank you, sir.

MR. SCHROEDER: Yes, my name is Steve Schroeder. I live at 676 Cottonfield Lane. I live out in the county, a couple of blocks away from Mr. Farley.

And I would like to know whether or not the comments made during this discussion are going to become a part of the public record?

MR. KIRCHNER: Yes. This is being video taped, will be aired, and will be part of the minutes of the meeting.

MR. SCHOEDER: That being the case, then I would like to let everyone know that I certainly endorse the comments of Mr. Baines and appreciate his effort.

I would also like to go back to a comment made by Mr. Kirchner with regard to the Blackman land use study and the number of citizens who participated in that.

And I would like as a matter of record that the record show the number of residents of the Blackman community who participated in the Blackman land use study versus the total number of people who are on that committee.

It's my recollection that there were on -- a neighborhood of probably about nine different folks who were on the committee, and I think only two of those people lived in Blackman.

MR. KIRCHNER: There was a committee established, and they had numerous public meetings with the residents. That is all public record.

MR. SCHOEDER: I understand it's all public record. Now, what I'm asking you to do is to go in and -- you made the statement, as I remember, that there were a lot of citizens from the Blackman community who participated in that.

MR. KIRCHNER: Yes, because I was at the meetings they attended.

MR. SCHROEDER: I don't believe that's true, that they were on that committee. And I would like the record changed to reflect that.

MR. KIRCHNER: That's fine. They were not on the committee. But there were public hearings and residents of the area that were incorporated into those discussions. We got their points of view.

But the committee itself was a finite number. You are correct. But there were several public hearings that are of public record that people came, observed what was being done, and gave their input to.

MR. SCHOEDER: That's correct. I agree with that. However, one of the other issues has to be the way that the public input was used by the committee. And there's a significant difference from the standpoint of being able to say, Hey, we took into account all of the public comments versus what was actually done.

Thank you.

MR. MOSER: Thank you, sir. Is there anyone else?

MR. LENTON: Thank you. I'm Mike Lenton. I live at 155 Spence Creek Lane which is just outside of the borders of Murfreesboro, tonight. I don't know about tomorrow the way Murfreesboro is growing.

Several issues I would like to speak about: I would just like to give my hearty endorsement to what's been said before, and also thank you for thinking in the long term.

This is so important, just not thinking five, ten, but fifty years down the road, especially when we look at numbers which were given suggesting that our population will double within the urban growth area.

One thing specifically, I think it's a real problem, this area that's been talked about previously tonight, this area which lies outside the urban growth boundary. It's been mentioned that we don't have a definition of actually what is a rural area.

We are represented by an attorney, Frank Fly. Frank isn't here tonight, but you all know Frank and he's been in a whole variety of meetings. And if he were here, he would wave the law for us.

And the law as established by the State of Tennessee isn't really court specific but is suggesting that an area outside of the urban growth boundary is rural, meaning it's appropriate for critters. It's appropriate for farms. It's appropriate for low-density housing.

I certainly understand the business regarding flood plains and that water generally does flow downhill. But boundary lines are legal, and even water can't flow over them.

And what this means is that if these areas down here and here are sewered, we have put in, as you said tonight, the infrastructure for high density housing which will go absolutely contrary to the characteristic of the law at least as it's been interpreted for me and certainly for the city commission.

This is, I think, a significant problem and something which really very well may have to be discussed in court. Thank you.

MR. MOSER: Thank you, sir.

MR. FARLEY: I'm Gary Farley, and I am a county commissioner out in the Barfield-Christiana area.

I've had -- when it come out in the paper, it's not about what you just got through having a public hearing on, it's about the Christiana school deal that will be coming up.

Mr. Kirchner, I called him and I asked him and I'd had some phone calls and some people wanting to ask some questions and make some comments. And he said this would be the time for that to happen.

First of all, I want to thank the city of Murfreesboro for looking at running the sewer out to the Christiana school, the old Christiana school and the new Christiana school coming up.

I think it's a very needed system out there for us to have our school out there.

I know there are some people in the area that are wanting to hook up, if at all possible. Now, I have told them -- I've discussed it with Mr. Kirchner and also Valerie, and they told me that it's a private line if it does -- if this board and the city council does approve that.

There are some people out there that are interested. And I told them that it could happen and it could not happen.

And at this time, if anyone of them would like to raise their hand that are out there in the area that would like to hook onto it if it come to that, I would like them to raise their hands at this time.

(Several hands were raised.)

MR. FARLEY: And there may be some of them that would like to come up and make a comment or whatever.

MR. MOSER: Mr. Farley, we have, you know -- Mr. Kirchner and I talked today about this same situation, and we have looked at this. And they're interested only in running to the school, the school board is.

And I asked Mr. Kirchner, I said, Why could we not put a sanitary sewer there that would flow back into our system because it would serve a lot of people like is out here in this audience today?

The difference is about 3 and a half million dollars. That's the difference in acquiring the right-of-way. And, you know, as you've been in this business, you know that's sometimes very difficult to do.

But everybody doesn't want our sewer.

MR. FARLEY: Right.

MR. MOSER: You know, so we -- but, of course, my thoughts were that we ought to try to do that if that is possible. It's a money situation. It's whether the people want it or not. Because the school has got, as I understand it, to have a sewer.

MR. FARLEY: Right.

MR. MOSER: Because I think they're to the point right now they need it probably tomorrow for the old school even.

MR. FARLEY: Correct. It's a problem out there with -- you know, it's running out in this field, and it causes a problem, a health problem with that.

MR. MOSER: Yes, sir.

Joe, do you have anything you would like to add?

MR. KIRCHNER: I just want to make it clear, too, that the first article that came out kind of sounded like we had taken action. This board has not been presented anything on that until this evening.

So, you know, a lot of that was, I think, presumptuous. And we will take it -- we'll make a recommendation to the board, and then they will deliberate on that; and in their due course, take

some kind of action on it.

But we certainly didn't want to get in the situation where we've been criticized before for circumventing the county planning commission and the county executive.

We certainly want to get their input and make sure that they're agreeable to this. Because like Mr. Moser said, some people want it, and some people don't.

And we want to make sure that -- we've been criticized for not including them in these deliberations, and we want to make sure that we do include them.

MR. FARLEY: Right. That's correct. And, I mean, like I told them when they called, when the article came out in the paper, I was getting phone calls and I couldn't answer their questions.

So the first thing I done, I called Joe. And then I couldn't get ahold of Joe, so I called Valerie, and they led me in the right direction. And I've told -- well, Mr. Arnold is really the one that called me, and he's sort of the spokesperson for that area out there. Most people were calling him.

I told him up front, you know, we've got people out there that don't want it. We've got people out there that do want it.

And I'm not going to get in that board. I know personally, I like the sewer. If I lived out there, I would want the sewer. But there are people that don't want it, and there are people that do want it.

MR. KIRCHNER: Mr. Farley, the one thing about the school that they made clear to me in our discussion with their staff is that they needed a school right now, and they're constructing it here and will hopefully open it up within two years or a year and a half.

MR. FARLEY: Right.

MR. KIRCHNER: You know, if we did a gravity sewer, it wouldn't be ready by then.

MR. FARLEY: Right.

MR. KIRCHNER: So that was another concern of theirs that we need it today. And they knew that anything that we did was a long-term type project. It would probably take a year to design it and then another 18 months to construct it. So you're looking at a couple of years out, and they needed something right away.

So that's one of the considerations that we'll have to give to this.

MR. FARLEY: Right. That is correct, because I've been fighting for the last two years to get a school out there in that area, along with Dr. Jones, him being a school board member, because Barfield School right now is overcrowded by approximately 300 or 400 kids. So we do need to be moving.

Finally, we're going to be getting a school out there in that area.

MR. MOSER: Well, you know, I totally agree with you. If it's feasible, it ought to be a gravity sewer -- and that's my opinion personally -- instead of putting a tight line all the way out there to the school and serve only the school itself.

MR. FARLEY: All right. Thank you.

MR. ARNOLD: Mr. Moser, it's good to see you.

MR. MOSER: Yes, sir, Mr. Arnold. It's been a long time. Both of us has got gray headed since then, I think.

MR. ARNOLD: Sure have. We've known each other for quite a few years, and the rest of the board here.

I'm speaking on behalf of the property owners down 231. I appreciate y'all coming.

I recently bought some land from Mr. Ralph Loyd up on Marshall Knob. I'm kind of gravity flow, if you think about it, back this way toward the city.

So in the meantime, as it was presented to me the way the school board is getting the line out there, they're going to dig a 36-inch line, 36-inch ditch.

A 36-inch ditch is a pretty wide ditch. Is it feasible to put a force main line in for the school and a gravity flow line in for the residents in the ditch as it's being constructed? Because that's mainly your cost on construction. Is it the material?

MR. KIRCHNER: No, it's not. The gravity flow would have to go with the relief of the area, and the force main can overcome hills and things like that.

Also, you need more separation from all of the utilities and that. So it's just not that simple of a thing.

MR. ARNOLD: Is it 18 inches apart that the lines could be in the ditch?

MR. KIRCHNER: I believe what I've heard from the school board, they are proposing to put a gas line and the force main 18 inches apart in the same ditch.

That's what makes it economical for them. If they had to do a separate ditch for each, then it may not be so economical. But they needed the gas, also.

One thing we did say is that, well, we were concerned that they were putting it in the right-of-way of the highway. Because what happens if later the highway department, Tennessee Department of Transportation, wants to modify within the right-of-way or expand, then if there are any utilities within that right-of-way, it's at the cost of that utility to relocate it.

MR. ARNOLD: We have a right-of-way, CUD, going out that way on the water. Is it feasible to put it on that right-of-way?

MR. KIRCHNER: Not without -- you would still have to get an easement on top of an

easement. We can't do anything without the permission of the property owner.

MR. ARNOLD: Okay. Well, you have my permission.

Mr. Moser, if you could say if you could get the main out there not on a force main, that would really be appreciated by the ones that's here tonight, because we basically don't have any systems out that way that will perk.

I understand by talking to some of the property owners, I'm a retiree, Aerostructures-type worker, and I haven't been involved too much in politics. But I can, you know, kind of have my feelings about what's happening in our city and what's happening in our country -- I mean, our county.

I live down here in the lower southern end of Rutherford County with a farm and have a few cows. You know, I'm sitting here listening. If you wanted to dump some of this solid waste, I have some real big fields, if you want to take care of some of that. But, now, I'm offering that as, you know, we'll talk later.

But Mr. Moser, I thank you. This would be a very prompt time to consider that for the residents out there on 231, out the urban growth boundary line here, because we could share the cost. And I don't know what the value -- how much it would be per owner. I think that would have to be figured. And as I went around and got the petition -- I walked the highway out here -- there's one lady out here that can't sell her property because she doesn't have a back-up system for her sewage. She cannot sell her property. She's sitting there wanting to sell, but she cannot sell.

A sewer line going that way would give her that back-up system. Thank you very much.

MR. MOSER: Thank you, sir.

This lady?

MS. PARSONS: My name is Susan Parsons, and I have a question. I don't know whether you're going to be able to answer it, Mr. Kirchner. But Mr. Farley and Mr. Kelly are here. They may know the answer.

I am outside the UGB. And my question is, I'm represented by, of course, the county. Is there any prohibition that the county is not allowed if they choose to extend sewer services out into residents outside the UGB, that they cannot go under contract with you all or provide that through CUD, that it has to go through the city and that the requirements would then cause annexation or -- not cause annexation, but that the request for annexation be made?

MR. KIRCHNER: Let me see if I get this question right. You're saying, can the county extend sewers and is there funds and efforts to do that?

MS. PARSONS: In other words, can the county initiate if they have a need for a sewer line in one of the county schools, can the county initiate that without going through the process of

the city and the annexation request? Can they come to you? Do they have any authority to come to you, or -- I don't think CUD does sewer lines. But --

MR. KIRCHNER: Correct. The answer to your question is that yes, they would have to come to us and they would fall under the ordinance and would have to make their request for annexation. But like we said before --

MS. PARSONS: The county would have to request annexation?

MR. KIRCHNER: Yes. Like in the Christiana school, they will have to request by our ordinance that annexation.

Now, that will be in due deliberations by the city planning commission as to whether it would be annexed or not. You know, they look at a lot of different variables in that. And my gut feel is that we're not going to go out and annex the Christiana school because of how far it is out.

MS. PARSONS: In the Buchanan area, if the county felt that there was a public health issue or some situation there, could the they have come to you and asked you to run the sewer line out there?

MR. KIRCHNER: They could come and ask us, or they could have done it themselves.

MS. PARSONS: They could have done it themselves?

MR. KIRCHNER: Yes, but they would still have to request the annexation.

MS. PARSONS: But the county could have done this themselves?

MR. KIRCHNER: In fact, this was done 20 or 25 years ago out Halls Hill Pike. The county received some community development grant funds and extended sewer out there and donated to the city to operate. And it's still in place today. And I think over at Searcy and Tune, I believe that was also --

MS. PARSONS: They donated the land?

MR. KIRCHNER: They donated the sewer. They installed the sewer and then said, Here it is, you operate and maintain it. You know, We'll pay for it. We got it in. We got this money to do it. Now you operate and maintain it.

In other words, it's kind of like a developer does. If he puts a subdivision in and he puts a sewer in there and then he donates that to the city as part of our system, and we operate and maintain that.

It was the same thing there. They got the funding for it. They put it in place and then turned it over to us to operate and maintain.

MS. PARSONS: Okay. So that basically if a developer or a community felt that there was a need for a sewer line, they could have gone to the county and expressed this need rather than circumventing that and going to the city?

MR. KIRCHNER: I believe they could. But probably the county would then come to us and --

MS. PARSONS: But you certainly understand that as residents of the county, the representation falls in the county, not the city. So that you would think you would go to the person who represents you and make a request to him?

MR. KIRCHNER: I guess you go to the provider because, for instance, the CUD, they're the water provider. You don't go to the county to get water. You go to CUD.

MR. DURHAM: The county could develop their own sanitary sewer system. That's the answer to that.

MR. KIRCHNER: Correct.

MR. MOSER: On the Halls Hill Pike, what was out there was a low income area and the Federal governments said, This money is available to cities if you meet this criteria. And we met that criteria, the county did. And they said, Look, we have these funds, we're going to build this sewer out there. And they built it and turned around and when they got it built, they gave us the sewer and said, Would you operate it?

MS. PARSONS: Okay. Well, I just, you know, have a little bit of a problem when a developer goes to you or the city and the county, and basically that's out of the loop. The county representation falls outside of the loop.

The school board is now coming to you over the Christiana school. And you in turn will be dealing with the City Council; correct?

MR. KIRCHNER: Correct. That would have to be the process.

MS. PARSONS: Again, I mean, it's like there's no representation, that they are circumventing the county in this issue.

MR. KIRCHNER: We've tried to pull that back in, though, because before we considered it, we wanted to make sure that the county planning commission and Nancy Allen and all -- we did not want to --

MS. PARSONS: The full commission?

MR. KIRCHNER: Well, I don't know about the full commission, but we are going to --

MS. PARSONS: Well, Nancy Allen is not the commission.

MR. KIRCHNER: Well, the planning commission is the one that would be considering the site plans and things of that nature.

MS. PARSONS: Right.

MR. KIRCHNER: And I've talked to John Davis and told him that, you know, we need to make sure what their feelings are on this. My understanding is --

MS. PARSONS: Has this gone before the planning commission?

A SPECTATOR: Yes. It didn't pass the full commission.

MS. PARSONS: I missed it. Okay.

MR. KIRCHNER: And we didn't want to circumvent that. That's the reason we were concerned when it came out in the paper, it sounded like it was a done deal and we did something. We did not.

That's when we got back with the school board and said, Look, we need to make sure that the county executive is involved, the planning commission is involved, the county planning commission, and things of that, so we get everybody into the planning loop in that.

MS. PARSONS: Well, I'm kind of wondering why we have any county representation because it seems to me that if we're going to go straight to the water and sewer board and then to the city council, that somehow -- you know.

MR. KIRCHNER: I think one way to look at it is, we're the provider of that service. So they would certainly come to us about that.

MS. PARSONS: But with the annexation there --

MR. KIRCHNER: The county planning commission has the land use authority over that. They're the ones that set the land use. They approve the site plans and things of that nature.

So the county still has a major play in that. Granted, the sewer gives them other capabilities they wouldn't have before as to development, but still it's the responsibility of the county in those areas for planning of that.

That is not our responsibility.

MS. PARSONS: Yeah, you're just the facilitator?

MR. KIRCHNER: Right.

MS. PARSONS: Right. Right.

MR. KIRCHNER: When the sewer line is put out there, it certainly facilitates development.

MS. PARSONS: Oh, yeah.

MR. KIRCHNER: And people are looking at those properties and the values that they could get from it and the higher densities. And that's their prerogative.

MS. PARSONS: Or the carrot of annexation.

MR. KIRCHNER: Well, I want to explain maybe how that came about.

About 20 years ago, there was some development occurring on the fringes of the city limits. A developer adjacent to the city limits got approval from the county to place a subdivision -- well, it was a cul-de-sac basically, a strip street, in without curb and gutter, without

underground utilities, with water and sewer.

The water and sewer department said, Yes, we'll provide water and sewer. They went to the county and got zoning, put it in, substandard to city street conditions and things and all.

That made us stop and say, Look, that's not right. If we're going to provide them the water and sewer, which is a city utility, then they need to also provide the curb and gutter, standard streets, the storm drainage and that.

And that's how that law or that ordinance came about so that it would not circumvent the other requirements of the city when you're providing city services.

MS. PARSONS: Didn't that -- wasn't there an ordinance that was changed within the past year that they do not require the curb and gutter outside the UGB?

MR. KIRCHNER: I don't know.

MS. PARSONS: I believe there was.

MR. KIRCHNER: That would be the county planning commission outside the UGB.

MS. PARSONS: No, this was the city council that passed an ordinance that they do not require the curb and gutter outside the UGB, nor do they require them to, you know, be inspected because they couldn't. I mean, how can someone in the county go to the city for an inspection?

MR. KIRCHNER: The way the ordinance reads that I have is that they're required to build the subdivision by our standards.

MS. PARSONS: Yes, inside the UGB. But then there was an ordinance that was, I believe, changed.

MR. MOSER: Susan, do you know anything --

MS. McGANNON: I don't know what they're referring to, no. There is a general ordinance.

MS. PARSONS: Okay. Well, I can bring you a copy of it.

MS. McGANNON: I'd appreciate that.

MS. PARSONS: Okay. Thank you.

MR. MOSER: Thank you. Anyone else?

MRS. DIAMOND: Lenore Diamond from Christiana.

I really have a question, I guess it's for Mr. Kirchner. I am totally confused, and maybe you can explain it to me.

In Thursday, March 7th, paper -- your picture is on it -- the second paragraph says, (as read) But the city has no immediate plans to extend its sewer past its urban growth boundary to the Christiana area for the next 15 to 20 years, and the board will own and maintain the force main sewer line to serve only Christiana schools, explained Joe Kirchner, etc.

And I don't quite understand that. And then a few minutes ago -- I'm not sure whether you said it or not -- you said the only reason that the Buchanan sewer assessment was in was there was a catalyst to go out there. And I also want to ask, what was that catalyst?

MR. KIRCHNER: The answer to the first question is, what I said there is that in our wastewater facilities plan, there's the Barfield-Salem interceptor that's proposed in the long-range plan which would go to the Christiana to serve. That is 15 years or greater out.

So our plan as it's been drafted did not have sewers going out to the Christiana school except 15 years beyond.

What the county school board proposed was they had an immediate need and wanted to put the pump station in and the force main to get it back into the Murfreesboro system.

Does that answer your question?

MRS. DIAMOND: No. I understand that because you explained that before.

What about the catalyst, then? What was the catalyst? Farrer Brothers requesting a sewer line to their property?

MR. KIRCHNER: We were just speaking about the Christiana school.

MRS. DIAMOND: Yeah, but it's all tied in because the Christiana school or the Buchanan school or the people out there, nobody was to get that sewer. It was going directly at the developer's request and deal with the city.

So I'm assuming, and you can correct me, if that catalyst -- is that what you were talking about the catalyst? And now it confused me and a lot of people have called and said, Well, what is this? You know, Mr. Kirchner said that they're not going to go beyond their urban growth boundary to Christiana, but yet you've already voted to go to the Farrer property so he can build 2100 homes. I'm totally confused.

MR. KIRCHNER: Okay. What we have discussed and what we are concerned about is because of the concern in the Buchanan area. When we were approached about the Christiana school, we said this is outside the urban growth boundary. We want to bring in the county planning commission and Nancy Allen into this to make sure that they all agree with this concept.

That's when we were criticized before, is that we didn't bring in the county into the issues. And so what we did was say, Okay, but we want the county to be involved with these discussions as far as getting sewer to the Christiana school.

MRS. DIAMOND: Yeah. Well, I think that's really important to get it to the Christiana and Buchanan school.

But what about the Farrer property? Is it still going out there, too?

MR. KIRCHNER: Yes.

MRS. DIAMOND: It's still going to go out there? Well, the community and nobody had any say in that. We had no representation in the city, and the city can come and do anything they want to the people out there and to that community without any input from the people.

But now all of a sudden, you were able -- you had to do that for the developer. But when it came to the school, now you can change the playing field a little bit. We don't have an equal playing field out there.

MR. KIRCHNER: Are you saying you would rather have the gravity sewer?

MRS. DIAMOND: I'm saying, we don't want a sewer out there because of the violation of the urban growth boundary and that it will cause high density housing. Farrer Brothers will then -- or any developer. I don't mean to single him out.

MR. MOSER: You live at Buchanan; is that correct?

MRS. DIAMOND: Yes, I do.

MR. MOSER: Not Christiana?

MRS. DIAMOND: Christiana is a whole huge area, and it is called -- I live in Christiana. My address is 6960 Millersburg Road, Christiana, Tennessee, 37037; and I've lived there for 19 years in Christiana.

So, you know, you can call it Buchanan. I'm Christiana, and the people who live down on 231 are also Christiana, and the ones who live near Hoover Gap are also Christiana.

MR. KIRCHNER: I want to make it clear that the state law as I've been told and have been advised is it doesn't preclude sanitary sewer service outside the urban growth boundary into the rural area. It doesn't preclude that.

The land use issues would be the Rutherford County planning commission issues as far as densities and things like that.

You know, we could put sewer out there and they could put, you know, large lots. I mean, it's just whatever would be the wishes of that planning commission.

MRS. DIAMOND: Okay. I see we're going around in circles. So I thank you for your time.

MR. MOSER: Thank you. Anyone else?

MR. MARTIN: My name is Paul Martin, and I own 116 acres right there at the exit of Buchanan Road, Epps Mill Road, and onto the interstate.

We bought a little farm there. Well, it's 116 acres. We had a little house. My wife remodeled that little house, and we spent quite a bit of money.

And then we got some wet weather. You could flush the commode once. That's all. The next time you flushed it, it would back back up.

So we couldn't stay there. I bought a house in Manchester. We come to the farm and visit the farm. And I drove down there during this last rain that we had.

I would say 60 to 80 percent of the homes in that area had water all around them. And these people don't think that that sewer from their lines is not going to come up and get in the streams? I've got news for them.

Y'all come on with the sewer. We need it. We need it real bad. If you do this, you know, you'll be within the Buchanan school. It won't be far to come over from the Buchanan school and tap into that line.

And most of the people that's against this live miles away from it.

Did you ever check your speedometer from Buchanan Road to where you live on Millersburg Road?

MRS. DIAMOND: Yes, I have.

MR. MARTIN: How far is it?

MRS. DIAMOND: Four miles.

MR. MARTIN: Four miles. Thank you.

With no further questions or comments from the audience the Public Hearing was closed.

---END OF HEARING---

CERTIFICATE OF COURT REPORTER

I, Marilyn Gorski, Court Reporter and Notary Public within and for the State of Tennessee, at large, do hereby certify that the foregoing pages, including this page, are a true and correct transcript of the video tape of the Murfreesboro Water and Sewer Board meeting held on March 13, 2002, to the best of my ability, not having been personally present to record same.

I further certify that I am not an attorney or counsel of any of the parties, nor a relative or employee of any attorney or counsel connected with the action, nor financially interested in the action.

_____, 2002

_____
MARILYN GORSKI, Court Reporter